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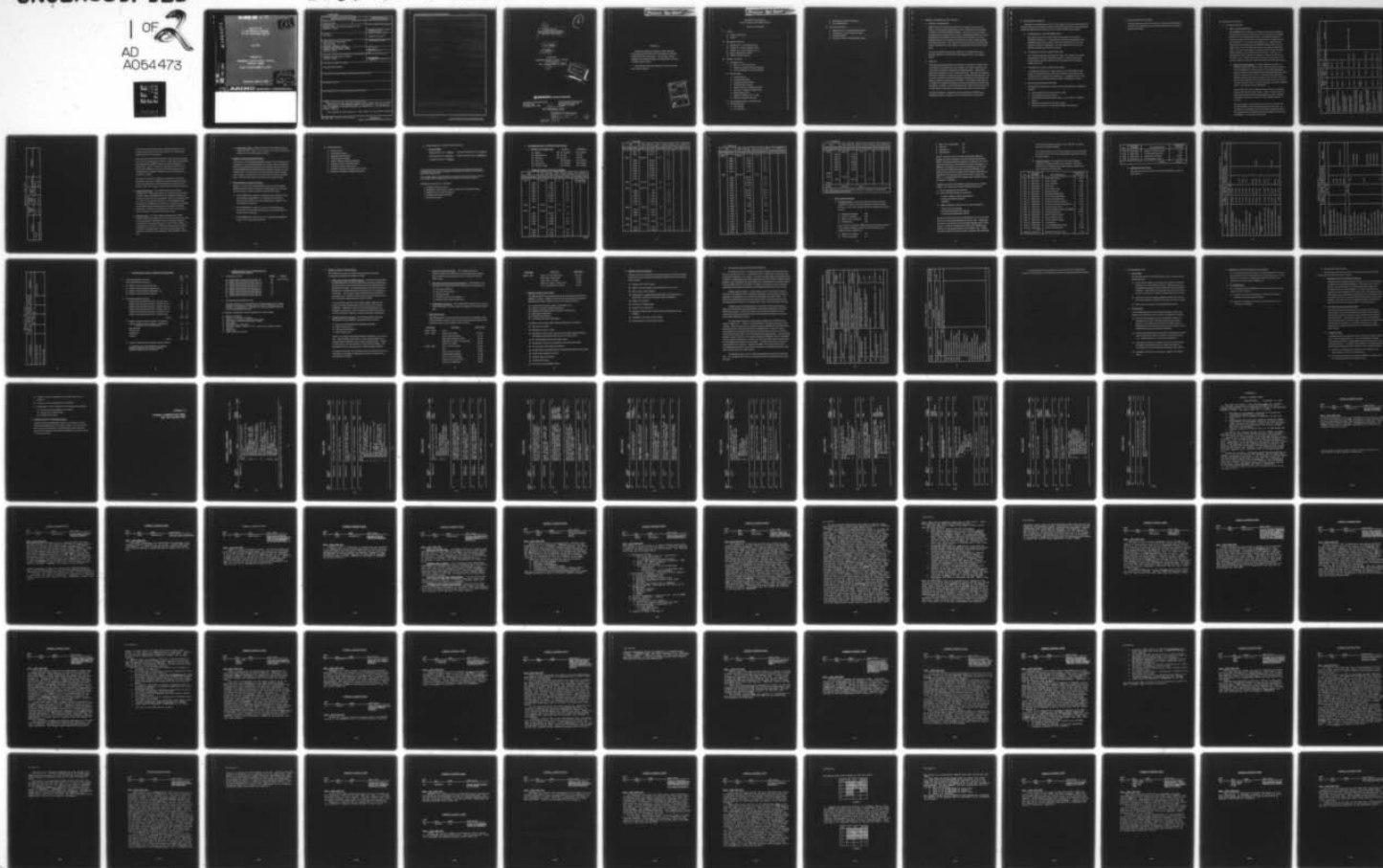
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ANALYSIS OF
FY 1974 REGULAR OVERHAUL
OF USS SAFEGUARD (ARS-25)

July 1974

Prepared for
COMMANDER SERVICE FORCE, PACIFIC
Honolulu, Hawaii

Under Contract N00604-73-C-0319

Publication 1609-01-1-1308

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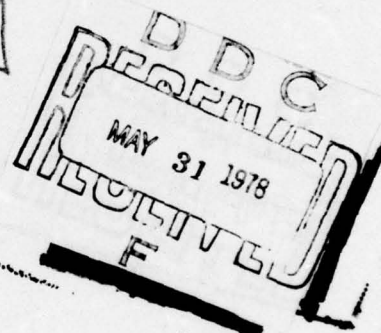
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ABSTRACT

Engineering services provided by ARINC Research Corporation for the fiscal year 1974 overhaul of USS SAFE-GUARD (ARS-25) are discussed. The services included assistance in advanced planning, and preparation of the post-overhaul analysis report.

This document has been prepared to a Navy format for ship overhaul reports.

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USS SAFEGUARD (ARS-25)
POST OVERHAUL ANALYSIS REPORT

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I. GENERAL INFORMATION AND PREFACE

A. GENERAL INFORMATION

ARINC Research Corporation provided the Commander Service Force, Pacific, with specialized engineering services relating to the 1974 regular overhaul of the USS SAFEGUARD (ARS-25). These services involved performing advance planning for the overhaul, evaluating the effectiveness of the planning program in light of the final results of the overhaul, and recommending means for increasing the effectiveness of future overhaul planning for similar Navy ships. This report addresses the activities associated with advance planning; it does not attempt to evaluate the results of the overhaul itself.

The work by ARINC Research was conducted for COMSERVPAC under Contract N00604-73-C-0319 with the Naval Supply Center, Pearl Harbor, Hawaii.

B. PREFACE

The advance planning milestones of Appendix A (provided by COMSERVPAC) were followed in preparation for the overhaul, with ARINC Research acting as the type commander's maintenance management agent. Planning commenced six months prior to the overhaul start date. The goal of the planning effort was to identify in advance any existing and potential problem areas, and to provide the detailed preoverhaul guidance, planning, and coordination necessary to achieve a successful yard overhaul. The purpose of this report is to evaluate the management judgments and decisions associated with the planning effort, to present a Long-Range Maintenance Plan for SAFEGUARD, and to make certain maintenance recommendations for this ship and its class.

The SAFEGUARD was overhauled under the direction of SUPSHIP 14 at Dillingham Shipyard, Honolulu, from 15 October 1973 to 1 April 1974.

II. MANAGEMENT SUMMARY

Following is a summarization of the FY 1974 regular overhaul of USS SAFEGUARD, including comments on deviations from the planning milestones and on nonprogrammed factors that influenced the completion time or overall quality of the overhaul.

A. AUTHORIZED VS. ACCOMPLISHED WORK

The repair portion of the SAFEGUARD work package was essentially completed as authorized. The authorized alteration work package was the controlling factor in the overhaul. When the ship departed the overhaul shipyard, the galley modifications were not complete because all of the necessary equipment had not been received.

B. PLANNED VS. ACTUAL COMPLETION TIME

The overhaul completion was extended 72 days as a result of late receipt of drawings for first-time alteration material, a strike of local sheet metal workers, and late receipt of GFM for improvement of the galley (shipalt ARS-274K).

C. PLANNED VS. ACTUAL COMPLETION COSTS

A comparison of planned vs. actual costs for the SAFEGUARD overhaul cannot be made herein since the SUPSHIP departure report had not been released as of the issuance of this document. A supplement to this report will be prepared and forwarded after receipt of the departure report.

D. MAJOR CONFIGURATION CHANGES

SAFEGUARD completed the overhaul with the following major configuration changes:

1. Newly installed AFFF fire protection system
2. New pollution abatement features
3. New habitability improvements in galley, mess decks, and sanitary spaces
4. Upgraded communication and radar systems
5. Improved armament - 20-mm and 50-caliber machine guns

E. FOLLOW-ON WORK REQUIRED

The major follow-on work still required to complete the SAFEGUARD overhaul is the installation of late-delivered equipments for the galley improvement shipalt.

III. DETAILS OF OVERHAUL

A. PLANNING PROCESS

1. Ideal Vs. Actual Milestones

The COMSERVPAC milestones for regular overhauls (see Appendix A herein) specify 50 tasks, of which 25 were the responsibility of ARINC Research for the SAFEGUARD overhaul. The ideal target dates for these tasks range from the start of overhaul minus 13 months (A-13) to the completion of overhaul plus two months (C+2). ARINC Research began advance planning for the SAFEGUARD in March 1973, only six months prior to the scheduled start date of the overhaul (9 September 1973). This made it necessary to compress the time frame of the planning milestones, and to combine some of the tasks. However, all planning tasks were completed on schedule, as shown in Table III.A-1. The start of the overhaul was delayed by about six weeks and its completion by about ten weeks for reasons discussed in the following section.

- a. Advance Overhaul Planning. Overhaul planning was initiated by ARINC Research with a survey of the available maintenance history of the SAFEGUARD as contained in the Current Ships Maintenance Program (CSMP) and the Maintenance and Material Management (3M) program material history report. Programmed ship alterations (shipalts) and type commander alterations were reviewed, along with other pertinent maintenance history documents such as last overhaul records, departure reports, Board of Inspection and Survey (INSURV) reports, and casualty reports (CASREPs).

Based on the data review, ARINC Research developed a shipcheck package and visited the ship in Sasebo, Japan. At that time it was learned that the SAFEGUARD was undergoing a major drydocking availability and therefore would not require docking during the overhaul.

The first package of work requests was received on 23 May 1973. The SAFEGUARD returned from deployment in early June. On completion of screening of the work requests by ARINC Research, those scheduled for accomplishment by the shipyard were delivered to SUPSHIP 14 commencing 21 June 1973.

TABLE III.A.1. IDEAL VS. ACTUAL MILESTONES FOR ROH OF USS SAFEGUARD (Sheet 1 of 2)

Milestone	Milestone Target Date	Contract Target Date	Actual Start	Completion	Remarks
Contract Start Date			3/1/73		
Obtain Historical Data, Review Alt Package	Immed.	3/1/73	3/1/73		
Receive Ship Work-Request Package	Immed.	3/1/73	3/1/73		
Screen Work Requests: Determine Known Work; Identify LLT Items	Immed.	3/1/73	5/23/73		
Brief Ship, Shipcheck Selected Work Items	Immed.	5/14/73	5/14/73	5/18/73	Shipcheck at Sasebo, Japan
Determine Preoverhaul Test and Inspection Requirements	3/10/73	4/15/73	5/15/73	6/15/73	
Submit Screened Work Requests to SERVGRU and SUPSHIP	3/10/73 5/6/73	6/21/73	6/21/73		
Receive New Work Requests; Screen, Submit to SERVGRU & SUPSHIP	6/5/73	8/14/73	8/14/73	10/15/73	
Conduct Preoverhaul Tests and Inspections	6/27/73	8/7/73	8/1/73	8/14/73	
Complete Tradeoff Analysis and Work Definition Conf.	7/20/73	10/1/73	10/1/73	10/1/73	

TABLE III.A.1. (Sheet 2 of 2)

Milestone	Milestone Target Date	Contract Target Date	Actual Start	Completion	Remarks
Overhaul	9/3/73	9/3/73	10/15/73	4/1/74	
Complete Final Report	11/2/73	4/24/74		5/31/74	

In August the SAFEGUARD underwent INSURV inspection. As a result, a large number of new work requests were screened and integrated into the work package.

Preoverhaul Test and Inspection (POT/I) requirements were identified as the work package was screened. These tests and inspections were performed by PHNSY during a restricted availability in August 1973. New work requests resulting from the POT/I were screened to SUPSHIP for inclusion in the work package, and by 15 September the integrated alteration/repair work package was essentially complete.

The start of overhaul was delayed to 24 September, and then to 15 October, due to late availability of shipalt drawings and associated job specifications, late accomplishment of POT/Is, and the number of late work requests resulting from the INSURV inspection.

- b. Tradeoff Conferences. The tradeoff conference was held on 1 October 1973. Before this conference a meeting was held with the overhaul manager (COMSERVGRU FIVE maintenance officer) and the ship to review the work specifications and resolve problem areas. As a result of the tradeoff conferences, a work package with an estimated cost of \$963,331 was authorized. Included were \$194,399 for NAVSHIPS-funded alterations and a contingency of \$68,693. Missing were estimates and specifications for the galley and food service alterations, shipalts ARS-274K and -275K.
- c. Overhaul Phase. The main planning responsibility of ARINC Research during the overhaul was to monitor its progress and assist in the management of SERVGRU resources in light of additional requirements developed during and as a result of the overhaul. To accomplish these objectives, ARINC Research personnel attended the SUPSHIP weekly progress conferences and provided liaison between the SERVGRU FIVE maintenance staff, SUPSHIP, and the ship.

- d. Postoverhaul Phase. ARINC Research's responsibility following completion of the overhaul was to analyze the overhaul records and prepare the postoverhaul analysis report.

2. Impact of Planning Milestone Slippages

The advance overhaul planning milestones call for early identification of alterations to be accomplished during the overhaul, and early authorization by the planning yard to have first-time shipalt drawings developed. For SAFEGUARD, the NAVSHIPS alteration planning message was issued 1 March 1973. This late start for plan development and the resultant late ordering of material had a direct effect on the overhaul completion date. Plans were still being received after the overhaul started.

3. Recommendations, Advanced Planning

Based on a review of the overall planning process for SAFEGUARD, ARINC Research offers the following recommendations for increasing the effectiveness of future overhauls for similar Navy ships:

- a. That COMSERVPAC continue to emphasize early submittal of ship work packages to SUPSHIP so as to facilitate development of accurate cost estimates and work specifications in support of the work definition conference.
- b. That COMSERVPAC continue to work for early definition and firming-up of the ship alteration package, and the authorization to develop required drawings.
- c. That COMSERVPAC increase the level of management attention it devotes to the actual overhaul period.

B. WORK PACKAGE

1. Summary Sheet
2. Cost Summary Sheet
3. Alteration Summary Sheet
4. TYCOM Repair Package
5. ARINC Research Screening Summary
6. Narrative of Major Alteration Items
7. Narrative of Major Repair Items
8. Narrative of Material Condition Prior to ROH
9. Narrative of Material Condition After ROH

B. WORK PACKAGE - USS SAFEGUARD (ARS-25)

1. Summary Sheet

Scheduled Start Date: 3 Sept 73 Scheduled Completion Date: 17 Jan 74

Actual Start Date*: 15 Oct 73 Actual Completion Date: 1 April 74

Overhaul Extended**: 72 Days

*Overhaul start delayed because of late ship alteration plans and associated job specifications, and receipt of additional work requests resulting from the INSURV inspection of August 1973.

**The topside phase of the SAFEGUARD overhaul was extended 72 days because of late receipt of galley equipment and a local strike of sheet metal workers.

SIGNIFICANT CAPABILITY CHANGES:

- a. Pollution abatement features
- b. Habitability improvements: galley, mess decks, and sanitary spaces
- c. Machinery space AFFF installation
- d. Upgraded communications/radar
- e. Improved armament.

2. Cost Summary Sheet - USS SAFEGUARD (ARS-25)

a. Summary of Overhaul Costs

	<u>K-ALT</u>	<u>REPAIR</u>
(1) Budget	(\$) Not available	Not available
(2) Estimated Cost	(\$) 104,399	768,932
(3) Bid Price	(\$) 186,395	790,605
(4) Total Cost	Not available	Not available
(5) Growth Cost	Not available	Not available
(6) Percent Growth	Not available	Not available

b. Estimated Overhaul Costs by EIC Category

EIC		EST. COST (\$)		PCT. TOTAL COST		PCT. GROWTH	
SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.
1000		41,689		4.7		(Not Available a/o July 1974)	
	1A00		965		0.1		
	1B00		6,604		0.7		
	1C00		8,836		1.0		
	1D00		712		0.1		
	1100		6,969		0.8		
	1500		11,523		1.3		
	1600		1,691		0.2		
	1800		4,389		0.5		
3000		13,852		1.5			
	3100		13,852		1.5		
4000		31,632		3.3			
	4100		10,381		1.1		
	4300		401		-		
	4400		2,941		0.3		
	4600		2,950		0.3		
	4700		14,959		1.6		
A000		97,981		10.7			
	AD00		8,449		0.9		
	A600		1,111		0.1		
	A700		1,803		0.2		

(Cont.)

b. (Continued)

EIC		EST. COST (\$)		PCT. TOTAL COST		PCT. GROWTH	
SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.
C000	A800	194,364	18,800	21.1	2.1		
	A900		67,818		7.4		
	CB00		40,285		4.4		
	CE00		50,003		5.4		
	C100		23,352		2.5		
	C300		34,916		3.8		
	C400		5,625		0.6		
	C700		12,797		1.4		
	C800		18,499		2.0		
	C900		8,887		1.0		
G000		18,097		1.9			
	GD00		18,097		1.9		
L000		12,692		1.3			
	LB00		568		0.1		
	LG00		909		0.1		
	LH00		2,004		0.2		
	LJ00		4,122		0.4		
	LK00		3,938		0.4		
	L100		1,151		0.1		
M000		13,974		1.5			
	M300		2,023		1.5		
	M400		7,332		0.8		
	M500		4,619		0.5		
N000		2,899		0.3			
	N400		2,899		0.3		
P000		12,418		1.3			
	P100		8,615		0.9		
	P600		3,803		0.4		

b. (Continued)

EIC		EST. COST (\$)		PCT. TOTAL COST		PCT. GROWTH	
SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.
Q000		20,617		2.3			
	QB00		1,420		0.2		
	QD00		6,798		0.7		
	QF00		2,399		0.3		
	Q000		2,142		0.2		
	Q100		715		0.1		
	Q300		7,143		0.8		
T000		350,587		38.5			
	T100		28,297		3.1		
	T300		3,308		0.4		
	T400		13,554		1.5		
	T500		14,450		1.6		
	T600		0				
	T700		99,877		10.9		
	T800		29,562		3.2		
	T900		28,535		3.1		
	TA00		4,361		0.5		
	TB00		0				
	TC00		3,671		0.4		
	TD00		1,897		0.2		
	TE00		0				
	TF00		39,968		4.4		
	TG00		0				
	TH00		0				
	TJ00		0				
	TK00		3,391		0.4		
	TL00		14,270		1.6		
	TM00		53,862		5.9		
	TS00		8,050		0.9		
	TT00		3,534		0.4		

b. (Continued)

EIC		EST. COST (\$)		PCT. TOTAL COST		PCT. GROWTH	
SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.	SYSTEM	SUBSYS.
U000		89,948		10.0			
	UC00		8,749		1.0		
	UF00		33,584		3.7		
	UG00		1,400		0.2		
	UH00		19,976		2.2		
	UX00		6,299		0.7		
	U500		1,713		0.2		
	U800		18,227		2.0		
W000		0					
Y000		15,416		1.7			
	YC00		15,416		1.7		
Z000		0					
TOTAL		916,166*		100.0			
*Total differs from summary sheet total because no contingency is included and some late estimates are included.							

c. Cost Avoidance Summary

- 1) Screening Actions. For the SAFEGUARD overhaul, 696 work requests were received from the ship and screened by ARINC Research. These work requests had been screened by the ship as follows:

- a) Shipyard Accomplish 69%
- b) Tender Accomplish 10%
- c) Ship's Force Accomplish 11%
- d) Not Specified 10%

As a result of screening by ARINC Research and with the approval of the overhaul manager, the final screening of these work requests for the overhaul was:

- a) Shipyard Accomplish 44%
- b) Tender Accomplish 7%

c) Ship's Force Accomplish	23%
d) Deferred	3%
e) Disapproved	7%
f) Miscellaneous	16%

The 26% reduction in the size of the work package (deferred, disapproved and miscellaneous screening) through detailed ship-checks, discussions with ship personnel, and analysis of the work requested represents a cost avoidance to the type commander. In addition to reducing the size of the work package, the remaining work requests, particularly those screened to SUPSHIP, were edited to ensure the work requested was accurately described and supported by referenced material such as plans, sketches and APL's. An estimated 90% of the shipyard work requests required corrections or additions.

Although an accurate cost estimate cannot be placed on all these actions, cost savings were realized in the following areas:

- a) Work requested and not authorized
- b) Reduced SUPSHIP manhours required to:
 - Prepare estimates and job specifications
 - Research referenced material
 - Shipcheck
- c) Reduced manhours required by the overhaul manager to:
 - Screen total work package
 - Research incomplete work requests
 - Research past maintenance history

Based on the ROH estimates for SAFEGUARD, the cost of a repair work item averaged approximately \$3,200 per item. Multiplying this value by the number of work requests requiring major rewriting (75), it could be concluded that a better work definition was achieved for approximately \$240,000 of overhaul work. Adding the 215 work items that required minor rewriting, and multiplying

by the \$3,200 average-cost figure, some \$688,000 of overhaul work also had better definition.

Also using this figure, the 171 items originally screened for shipyard work by ship's force but not authorized represents \$547,200 of cost avoidance.

- 2) Tradeoff Analysis. In preparation for the work definition conference, a tradeoff analysis was conducted. Work items deleted from the shipyard work package with the overhaul manager's approval are listed below.

EIC	JOB IDENT NUMBER	JOB DESCRIPTION	ESTIMATED COST (\$)
1101	DA01/1014	Repair Stern Roller	4,672
1103	DA01/0204	Renew Lifelines	3,969
1105	OE01/8110	Lower Flag Bag	929
1403	DA01/1025	Ship's Brow	1,524
1405	DA01/1039	Hawse Pipe Covers	2,272
1503	ER01/7026	Replace MJ Doors	1,133
1800	SX01/9011	Rep Parts Storage Bins	4,450
1806	DB01/2014	10" Salvage Pump/Engine	5,035
1806	EM02/0222	Salvage Pump Shaft Assy	1,198
191N	SX01/0049	Rep/Renew Storage Drawers	3,492
330C	EM02/6049	Auxiliary Generator Pumps/Hoses	5,938
4000	OE01/8175	Relocate Power Panel	167
A600	OE01/8008	Renew Navigation Bridge Roof/Shield	8,903
C301	EM02/0680	P/S Reduction Gear	16,353
M500	WG01/0005	AER-94 Audible Alarms	4,141
T706	ER01/7036	Rep 5" Flapper Valve	677
T900	ER01/7046	P-250 Flywheel Inspect.	741
TF03	EM01/5033	Air Reducers	510
TF03	OE01/8195	LP Air-Radio/Radar Rooms	1,941
TK00	DM01/5028 /5034	Repair Distilling Plant	6,445
TM06	DA01/1042	AER-107 Rel Capst. Cont	623

EIC	JOB IDENT NUMBER	JOB DESCRIPTION	ESTIMATED COST (\$)
Y109	EA91/0025	Repair Port WK Boat Engs	8,184
Y109	EA01/0026	Test/Insp Stbd Boat Eng	104
YA00	DA01/0200	Replace CO ₂ Lifeboats	22,345
YC01	DA01/0175	New Lifejacket Locker	4,331
TOTAL			109,177

3. Alteration Summary Sheet

The alteration summary sheet for the USS SAFEGUARD is shown in Table III. B-1.

TABLE III. B-1. ALTERATION SUMMARY SHEET - USS SAFEGUARD (Sheet 1 of 3)

ALTERATION	FMP COST (\$)	NAVSHIP EST. (\$)	SUPSHIP COST (\$)	ACTUAL COST (\$)	REMARKS
K ALTS - ARS					
212 UHF RADIO EQUIPMENT	14,606	16,065			
216 CRYPTO TYPE N	43,055	46,053			
239 1 JV & MJ SYS	25,179	26,775	7,332		
240 AN/SPS-53	22,127	23,562	7,271		
250 VHF/UHF SECURE VOICE	15,805	17,136	2,339		
251 GEN WT & MOM COMP	10,573	11,781			
254 AFFF	96,574	103,887	27,994		
265 P/A SEWAGE CHT	149,984	160,650	72,313		Partial
266 P/A BILGE DISCHARGE RISER	10,573	11,781	4,361		
268 P/A FUEL TANK LEVEL IND.	78,698	84,609	14,337		
271 P/A BILGE FLOOD ALARM C.	5,232	5,355	3,567		
275 H/I CREW GALLEY MODS	47,306	50,337			Partial
276 H/I SAN SPACE VENT/SHEATH	106,057	89,964	43,481		
278 RADAR REPEATER	5,232	5,355	1,344		

TABLE III, B-1. (Sheet 2 of 3)

ALTERATION	FMP COST (\$)	NAVSHIP EST. (\$)	SUPSHIP COST (\$)	ACTUAL COST (\$)	REMARKS
D ALTS - ARS					
231 BOILER CHEM FEED SYS			1,012		Equip. not received
232 REFRIG. SPACE DRAINAGE			18,097		
247 20 MM & 40 CAL GUNS			2,004		
248 WIND INDICATOR SYS			24,530		
283 IMPR SAN SPACES					
AER - ARS					
1 NAV LIGHT DIMMER			335		SF Accomplish
45 SINK BOOSTER HEATER					SF Accomplish
86 BACK UP HOOK DOG					
88 FLEX DISCON SWITCH					
92 RPL SMALL ARMS LKR			2,133		SF Accomplish
94 INST. ALARMS					SF Accomplish
98 NON-LOCK VLV PROT.					SF Accomplish
102 REPLACE FUSE CLIPS					SF Accomplish
105 RPL ALUM HANDWHEELS					SF Accomplish
106 TASK LIGHT DIMMER			347		SF Accomplish

TABLE III. B-1. (Sheet 3 of 3)

ALTERATION	FMP COST (\$)	NAVSHIP EST. (\$)	SUPSHIP COST (\$)	ACTUAL COST (R)	REMARKS
AER - ARS (Cont)					
107 CAPSTAN CONTROL					SF Accomplish
108 F.O. SYS. GAUGES					
111 SAF-T-CLIMB					

4. TYCOM Repair Package - USS SAFEGUARD (ARS-25)

	<u>No.</u>	<u>Pct</u>
1. Total Work Requests Screened	696	
Total Automated Work Requests	0	
2. (a) Number of Work Requests Deferred	18	2
(b) Number of Work Requests Disapproved	47	7
(c) Number of Work Requests Duplicated, etc.	111	16
(d) Number of Work Requests Approved	520	75
3. Total Work Requests Approved		
Number Work Requests Screened: Priority One (1)	14	2
Number Work Requests Screened: Priority Two (2)	140	27
Number Work Requests Screened: Priority Three (3)	289	56
Number Work Requests Screened: Priority Four (4)	72	14
Number Work Requests Screened: Priority Five (5)	4	1
Number Work Requests Screened: Priority Six (6)	1	0
	<u>520</u>	<u>100</u>
	TOTAL	
B. Number of Approved Work Requests by Type Work		
Repair (including Remove, Replace, Manufacture, Drydock, POT/I and Calibration)	470	90
Ship Alteration	17	3
TYCOM AER	7	1
Habitability	15	3
Routines	11	3
	<u>520</u>	<u>100</u>
	TOTAL	
C. Number of Approved Work Requests Insurance Items:		
As insurance items were identified, the ship was advised to include them in the work package. Separate identity was not maintained.		

5. ARINC Research Corp. Screening Summary,
USS SAFEGUARD (ARS-25)

1. SCREENING ACTION	<u>ARINC</u>	<u>TYCOM</u>
(a) Number Work Requests Screened One (1)	255	See Comments
(b) Number Work Requests Screened Two (2)	50	
(c) Number Work Requests Screened Three (3)	163	
(d) Number Work Requests Screened Four (4)	1	
(e) Number Work Requests Screened Five (5)	36	
(f) Number Work Requests Screened Six (6)	5	
(g) Number Work Requests Screened Seven (7)	10	
(h) Number Work Requests Screened Eight (8)	18	
(i) Number Work Requests Screened Nine (9)	47	
(j) Number Work Requests Screened Zero (0)	111	
(*)		

2. COMMENTS/RECOMMENDATIONS

Screening actions were reviewed with the overhaul manager prior to being finalized. No distinction was made between "ARINC" screening action and "TYCOM" screening action. Generally, the overhaul manager concurred with the recommended screening.

(*)LEGEND: SCREENING ACTION (APPENDIX 17 OPNAV 43P23)

1. Shipyard accomplish
2. Tender or repair ship accomplish
3. Ships Force - (tender or repair ship/yard) assist
4. Accomplish as alteration equivalent to a repair
5. Ship to shop
6. Accomplish with modification
7. Yard open inspect -- advise TYCOM -- proceed with minimum repairs
8. Deferred
9. Disapproved
0. Other - Specify in remarks

6. Narrative of Major Alteration Items

The following comments are offered concerning major alterations accomplished during the SAFEGUARD overhaul.

- a. Galley, Mess Decks, and Sanitary Spaces. Problems associated with accomplishing these alterations, particularly the galley modifications, were the primary causes for delaying the start and completion of the SAFEGUARD overhaul. Development of plans was delayed because of difficulties in identifying the type and dimensions of new equipment to be installed. Late receipts of plans resulted in late preparation of associated job specifications and the need to delay the overhaul start to allow contractors sufficient time to bid the overhaul.

As the overhaul progressed, late receipt of galley equipment and a strike by the sheet-metal workers caused a delay in the overhaul completion. Significant work by forces afloat intermediate level maintenance activities was still required after SAFEGUARD left the overhaul contractor's shipyard to complete the galley modifications.

- b. Pollution Abatement Features. The following pollution abatement alterations were accomplished during SAFEGUARD overhaul:

- 1) Sewage collecting/holding tank installation (partial)
- 2) Bilge discharge riser
- 3) Fuel tank level indicators
- 4) Bilge flooding alarm

Plans for the sewage collecting/holding tank installation were received late. After installation had started, extensive piping changes were required which contributed to the overhaul completion delay. Finally, the GFM pumps were not available to complete this alteration. The installation is to be completed under a separate shipalt, ARS-303.

Completion of the tank level indicating system was delayed because one transmitter was damaged in shipment and had to be returned to the manufacturer for repair.

- c. AFFF Fire Protection System. The machinery space fire protection system was improved by the installation of the twinned-agent, aqueous film forming foam (AFFF) and purple-K powder (PKP) system.
- d. Upgraded Communication and Radar Systems. SAFEGUARD's communication and radar systems were improved by the installation of;
 - 1) UHF radio equipment
 - 2) CRYPTO system, type N
 - 3) AN/SPS 56 radar
 - 4) VHF/UHF secure voice subsystem
 - 4) Standard radar display in pilot house
- e. Update Ship's Armament. The SAFEGUARD's armament was improved by the installation of 20-mm mounts and additional 50-caliber machine guns.

7. Major Repair Items

The following table is a list of the major work items accomplished during the SAFEGUARD overhaul. Work on these items progressed satisfactorily, and did not impact on the timeliness of the overhaul.

<u>Cost Range</u>	<u>Work Item</u>	<u>Actual Cost</u>
>\$50K - \$100K	(None)	-
>\$25K - \$50K	Repair Main Motors	\$47,820
	Repair Main Generators	40,285
	Main Engine Reduction Gears	34,916
	Sandblast Preserve T.S. Structures	33,584
	Repair Aux. Boiler	28,297
>\$10K - \$25K	Nos. 1 & 2 Fire Pumps	22,488
	ASF	19,976
	Clean & Test FO Tanks	18,800
	Repair Anchor Windlass	18,546
	100, 50 & 30 KW MG Sets	14,959
	Repair HP Air Compressor	13,678
	Install Air Conditioners	13,554

<u>Cost Range</u>	<u>Work Item</u>	<u>Actual Cost</u>
>\$10K - \$25K	Repair LP Air Compressors	\$13,494
	Main Engine Components	13,216
	Repair Aux. Generators	12,602
	Repair (7) Pumps, (5) Mtr/Cont.	11,199
	No. 2 Deck Winch/8 Ton Boom	10,618

8. Material Condition Prior to ROH

The USS SAFEGUARD was inspected by the Board of Inspection and Survey (INSURV) in August. INSURV reported the following material deficiencies that affected the ship's ability to carry out its assigned missions:

- (a) No fixed fire-protection system in the engine room
- (b) Numerous salvage-related discrepancies
- (c) Inability of the towing machine to pull its required load
- (d) Main engine deficiencies
- (e) Evaporator deficiencies
- (f) Communication system deficiencies

In addition, the following safety-related deficiencies were reported:

- (a) Purifiers not reliable
- (b) Ship cannot emergency steer
- (c) AN/SPS-21 antenna safety switch not located under antenna platform, and hinged access plate obstructs access to safety switch
- (d) Wire transmitting antenna rubs against stack
- (e) Wrong type of relief valves installed on steam-jacketed kettles
- (f) Air compressor HP cutouts not installed
- (g) Auxiliary diesel expansion tank hard-connected to potable water system
- (h) Reefer plant marginally operable
- (i) Climber safety not installed
- (j) Deteriorated cabling
- (k) Ac shore power installation unsafe

9. Material Condition After ROH

Extensive work was performed on the ship during the overhaul specifically to correct the major material discrepancies existing prior to the overhaul. These included:

- (a) Installation of AFFF system
- (b) Repair of towing machine, and installation of new tow wire
- (c) Major repair of main engines
- (d) Installation of communication shipalts 250K, 212K and 216K (see Section B6), with major work items being accomplished
- (e) Repair of LO purifier
- (f) Overhaul of steering system
- (g) Repair of air compressors
- (h) Renewal of high-pressure cutout switch and refrigeration space drainage
- (i) Installation of the Saf-T-Climb system
- (j) Improvement of ac shore power system.

C. LONG RANGE MAINTENANCE REQUIREMENTS

An essential element of overhaul maintenance planning is assuring continuity from one overhaul to the next. An influential factor in attaining this continuity is the Long Range Maintenance Plan (LRMP). Using the completion date of the SAFEGUARD overhaul as a starting point, and utilizing the records of that overhaul, ARINC Research prepared a plan identifying long range maintenance requirements for the SAFEGUARD. This plan addresses the period between overhauls, and specifies major maintenance requirements that should be targeted for accomplishment during the next overhaul.

Together with the LRMP, a second group of work, that deferred during the overhaul, was identified and the associated information was provided to the ship for inclusion in and updating of the current Ships Maintenance Projects (CSMP). The LRMP does not discuss the work entered into the CSMP, although planning for and accomplishment of that work is an integral part of long-range maintenance planning.

Probably the most important aspect of long-range maintenance planning is ship's force scheduling and accomplishment of 3M Planned Maintenance Subsystem (PMS) requirements. If ship's force pursues this program thoroughly and conscientiously, maintenance problem areas can be identified promptly and corrected before major deficiencies develop.

The long-range maintenance requirements identified for SAFEGUARD are shown in Table III.C-1. Section A of that table lists work defined during the recent overhaul. Ship's force and/or the overhaul manager (COMSERVPAC/COMSERVGRU) should start now to plan and budget for its accomplishment. Section B is work recommended for accomplishment during the next overhaul that requires actions by the overhaul manager early in the ROH requirements planning phase. Long-lead-time material must be ordered, or preoverhaul testing and inspection has to be scheduled to firm up repair requirements. Section C is work that should be given high priority for accomplishment during the next overhaul. For most of this work, preoverhaul testing should not be required. Section D identified PMS-related actions whose accomplishment during the period between overhauls is considered especially important in preparation for the next overhaul.

No attempt has been made to include programmed ship alterations into this plan. It is considered that these are adequately handled by existing programs under the FMP.

TABLE III. C-1. DEFERRED WORK/LONG RANGE MAINTENANCE ACTIONS - USS SAFEGUARD (ARS-25)
(Sheet 1 of 2)

EIC	DESCRIPTION	REMARKS	EST. COST (\$)
A. WORK DEFINED AND DEFERRED DURING FY 1974 REGULAR OVERHAUL			
1B00	Galley Modifications	Complete installation deficiencies existing at end of overhaul	Included in overhaul
T700	P/A Sewage Collecting/Holding Tank	Complete installation of missing pumps and associated equipment when available	No estimate
B. REPAIRS RECOMMENDED FOR NEXT REGULAR OVERHAUL REQUIRING LONG LEAD TIME MATERIAL (LLTM)			
AD00	Doors, Hatches, and Scuttles	Inspect and define requirements 12 - 18 months before overhaul. LLTM.	None; S. F. accomplish
C. OTHER LONG-RANGE MAINTENANCE REQUIREMENTS			
3000	Conduct Electrical Power Requirements Study	Conduct at least 12 months before next overhaul to define additional equipments required	25,000*
1000	Conduct Habitability Study	Conduct at least 12 months before next overhaul to define deficiencies and establish priorities	5,000*
A000	Conduct Exterior Underwater Hull Survey	Next docking	5,000*
T100	Evaluate Condition/Capacity of Auxiliary Boiler	Determine if installation should be upgraded. LLTM	No estimate
T300	Vent/Exhaust System Survey	Conduct at least 12 months before next overhaul to define requirements	3,000*
*Values are ARINC Research estimates.			

TABLE III. C-1. (Sheet 2 of 2)

EIC	DESCRIPTION	REMARKS	EST. COST (\$)
C. (Continued)			
TF00	Conduct Diver Air Requirements Study	Conduct at least 12 months before next overhaul to define requirements	3,000*
D. PMS ITEMS (SHIP'S FORCE ACCOMPLISHMENT			
1806	Salvage Equipment		
1807	Diving Equipment		
310U	Ship Service Diesel Generators		
4000	Electrical Safety Devices		
4400	Power Distribution Cabling		
C000	Main Propulsion Diesel Engines		
	Reduction Gears		
	Main Propulsion Generators		
	Main Propulsion Motors		
T104	Auxiliary Boiler		
T500	Refrigeration System		
T800	Firemain Piping and Valves		
TF00	Compressed Air Systems		
TK00	Evaporators		
TM00	Deck Machinery		
	Towing Machine		
*Values are ARINC Research estimates.			

The work deferred had no impact on the overall quality of the SAFEGUARD overhaul, or on the ability of SAFEGUARD to perform its assigned tasks and missions.

D. RECOMMENDATIONS

1. For the Ship

It is recommended that SAFEGUARD ship's force personnel take the following actions:

- (a) Ensure that the CSMP is up-to-date and accurately reflects the condition of the ship following overhaul. Deferred work items accomplished during the overhaul should have completed actions submitted. Work that was not completed should be reviewed and revised as necessary to reflect its status at the end of overhaul.
- (b) Follow-up and ensure receipt of updated record plans and documents that reflect the condition of the ship at the end of overhaul.
- (c) Take action as necessary to accomplish deferred work.

2. For the Class

It is recommended that for the ARS-23 class ships, the type commander, with assistance from the ships, accomplish the following:

- (a) Plan for and accomplish a series of habitability studies and incorporate the results into future alteration and overhaul planning. The objective of this action is to update priority of accomplishment and obtain the necessary data to authorize early development of plans and ordering of material.
- (b) Review existing alterations to determine new equipment/material requirements and take action as needed to obtain these items, e.g., replacement of M. G. sets and air compressors.
- (c) Take follow-up actions as required to resolve electrical power availability/requirements for these ships, and provide for accomplishment of any modifications during the next overhaul.
- (d) Investigate the need for an alteration to upgrade the auxiliary boiler.

3. Standardized ROH Work Requests (Form 4790.2K)

It is recommended that the program to develop standardized ARS class work requests and overhaul specifications be actively pursued. ARINC Research is currently developing such a proposed standard work package under contract with COMSERVPAC.

4. For COMSERVPAC

It is recommended that COMSERVPAC take the following actions with respect to ship overhauls:

- (a) Consider more active participation of PERA(CSS)/contractor during the overhaul management phase.
- (b) Increase the emphasis on advance material definition and procurement for overhauls.

E. EVALUATION/USEFULNESS

The following comments are offered on the products prepared by ARINC Research for the ship and industrial activity.

1. Integrated Work Package Summary Reports

Computerized work package summary reports were issued periodically throughout the overhaul planning phase. These reports were used by the ship, overhaul manager, and ARINC Research to progress the development of the overhaul package. The ability to produce these reports in various sequences such as work center-job sequence number, EIC category, type commander screening action, and industrial activity item number proved to be a valuable aid in managing the overhaul work package. They also served as an expedient method of keeping ship's force advised as to the screening action for its work requests.

2. Preoverhaul Test and Inspection Report

As the SAFEGUARD work package was reviewed and screened, the requirements for preoverhaul testing and inspection were identified. The overhaul activity was advised of these requirements through the overhaul manager. The usefulness of these tests in many instances was marginal because of the poor quality of the reports received following the tests and inspections. For future overhauls, the results expected from specific preoverhaul tests and inspections should be better defined.

3. Tradeoff Analysis

A tradeoff analysis was prepared and provided to the overhaul manager prior to each tradeoff conference. For the SAFEGUARD overhaul, these analyses provided an approximation of what the two phases of the overhaul would cost. An analysis of the depth by the overhaul planning task definition could not be made, however, for the following reasons:

- (a) SUPSHIP job estimates for all jobs were not available, and in some instances were of the ball-park type.
- (b) The time interval between receipt of SUPSHIP job estimates and the tradeoff conference was extremely short.

- (c) Complete man-hour estimates for ship's force jobs were not available.
- (d) Tender man-hour availability was not identified.
- (e) Identification of costs associated with the following was difficult:
 - (1) Advance planning expenditures by SUPSHIP
 - (2) Design service contract costs
 - (3) PHNSY farm-in costs

4. Periodic Overhaul Planning Status Reports

Periodic overhaul planning status reports were prepared by ARINC Research and distributed to the overhaul manager. It is believed that they served a useful purpose in documenting the overhaul planning effort, and in keeping overhaul/planning management personnel advised of the program status.

APPENDIX A
OVERHAUL PLANNING TASK INDEX
AND TASK DESCRIPTIONS

COMSERVPAC - OVERHAUL PLANNING

September 15, 1972

INDEX OF TASKS

TASK NO.	TARGET DATE *	TASK	ACTION COMMAND	PAGE
1	Immediately	Obtain Historical Records and data and have copies of the following for review: 1. Ship Characteristics and mission assignments. 2. Class Improvement Plan (CIP) 3. Ship Improvement Guide (SIG) 4. 3M-Current Ship's Maintenance Project (CSMP) 5. 3M-Report of Completed Repairs and Alteration Actions/Condensed History. 6. Ship Systems Definition and Index or Staging Diagrams 7. FMP Material Supplement and alteration Check-off Listing. 8. Ordalt Applicability List. 9. SECAS Report 10. TYCOM Shipalt Program "D" and "F" ALTS and AER'S 11. ROH and RAV Departure Reports. 12. CASREPS.	PERA	A-14

A-3

*Dates are given in months before or after the start of overhaul except as noted.

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
2	Immediately	Verify Ships Systems Staging Diagrams	SHIP	A-15
3	Immediately	Perform COSAL Validation	SHIP	A-16
4	Immediately	Review and Identify DART Corrective Actions That Can Be Implemented During Overhaul.	PERA	A-17
5	Immediately	Prepare List of Essential Systems.	PERA	A-18
6	Immediately	Prepare ALT/Repair Package Summary -- First Cut: 1. Review FMP ALT & Material Requirements for Programmed ALTS. 2. Identify Late Reprogram Requirements. 3. Obtain Drawings on Outstanding ALTS. 4. Review CSMP for Action and to Scope Repair Package. 5. Review CSMP to Determine Actions Required to Indoctinate Ship in Preparing Adequate Description on Work Requests. 6. Review for Known/Unknown Work Requirements.	PERA	A-19

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
7	Immediately	Review Forecasted Alteration Package for: 1. First Time ALT Drawing Requirements. 2. Material Requirements. 3. Shipcheck Requirements. 4. Revision to existing drawings. 5. Planning and schedule events to ensure orderly accomplishment of above events.	PERA TYCOM	A-20
8	Immediately	Incorporate Alteration Package (K,D, F & AER) into Repair Package and Recommend Necessary Action if Required in Accordance with FMP Procedures.	PERA	A-20
9	Prior to Deployment	Brief Ship on Overhaul Preparation Including Preparation of Work Requests and SFOMS Planning.	TYCOM PERA	A-21
10	Prior to Deployment	Inspect Ship and Prepare Maintenance Data Forms. Review and Up-Date CSMP for Overhaul Requirements.	SHIP	A-22
11	Prior to Deployment	Start SFOMS Planning	SHIP	A-26

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
12	Immediately	Review Up-dated Material History Report and Work Requests and Prepare Actions as Required for Inclusion of "Insurance Items" in Work Package.	PERA	A-27
13	Immediately	Review Work Package. Prepare Work Briefs (Scopes) and Identify Long Lead Time Material.	PERA	A-28
14	A-13	Prepare List of Predeployment Tests and Inspections Based Around Known/Unknown Work Requirements. Task Activities to Ship Check Repair Work Package Based on CSMP and Other Data.	PERA DESIGNATED ACTIVITIES (COORDINATE WITH PARENT SQUADRON)	A-29
15	A-10	Perform Pre-deployment Inspections, Tests and Ship-Check and Include Shipboard Review of ALT Work Package and Selected Repair Work Elements from CSMP. Update CSMP.	SHIP, PERA, OTHERS ASSIST.	A-31
16	A-10	Issue Message Listing Tentative SHIPALTS Planned.	NAVSHIPS 427	A-32
17	A-10	Issue Message Listing Tentative ORDALTS Planned.	NAVORD	A-32

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
18	A-9 Start	Cost estimate all known work and Identify Missing Work.	SHIPYARD or SUPSHIPS.	A-33
19	A-9	Ship Deploys - Update CSMP and ROH Plan. Forward Completed Actions.	SHIP	A-34
20	A-7.5	Forward Pre-printed Work Requests to PERA.	TYCOM	A-36
21	A-9 to A-6	Review and Validate all Work Requests. Consolidate Overhaul Planning and Identify Weaknesses. Prepare Integrated Work Package Summary.	PERA	A-37
22	A-9 to A-6	Review Work Package, Determine "Known" Work and Identify Long Lead Time Requirements. Review "Unknown" Work.	PERA	A-38
23	A-6	Prepare Pre-Overhaul Test & Inspections Tailored Around Known/Unknown Work Package.	PERA	A-39

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
24	A-6 to A-3	Arrange for and Accomplish Pre-ROH Test and Inspections Tailored around WESTPAC Operations. Include the Special Pre-ROH Tests such as: 1. UNREP System. 2. Boiler Inspection 3. Electronic System 4. Ordnance System 5. Others as Authorized.	SQUADRON PERA, SHIP	A-41
25	A-6	Prepare Ship's Force Manpower Budget	SHIP	A-42
26	A-6	Order Ship's Force Long Lead Time Material	SHIP	A-44
27	A-6	Submit New Work Requests for Items not Contained in CSMP.	SHIP	A-46
28	A-6	Issue 180 Day Letter on "K" ALTS	NAVSHIP	A-47
29	A-6	Issue Authorization Letter on ORDALTS.	NAVORD	A-47

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
30	A-6	Schedule ROH Tender Availability and Other IMA'S Availabilities.	SQUADRON	A-48
31	A-6 to A-4	Review, Refine and Assemble Complete ROH Work Package (Scope all Repair Actions) 1. Structure by SSDI 2. Identify Priority and Accomplishing Activities. 3. Prepare Work Briefs (Scopes) and Obtain Cost Estimates.	PERA	A-49
32	A-3.5	Perform Trade-off Analysis	PERA	A-50
33	A-3	Submit Summary Work Package Report to ALCON for Review. PERA to Structure Report for TYCOM/SQUADRON/SHIP Concurrence or Revision	PERA	A-53
34	A-2.25	Ship Arrives Pearl: Pre-Overhaul Ship-Check and Inspections (Pearl to CONUS) 1. Conduct Special Pre-ROH Test and Inspection 2. Assist Ship's Force in SFOMS Set-Up 3. Review Status of Work Package Up-Date and Priorities.	PERA LEAD ACTIVITY CONUS BASED SHIPS ONLY	A-54

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
35	A-2.25	Work Package Review Conference at Pearl	TYCOM CONUS BASED SHIPS ONLY	A-55
36	A-2	<u>Ship Arrives Home Port - Starts</u> 30 Day Stand-down	SHIP	A-56
37	A-2	Conduct Work Package Trade-off Conference	PERA	A-57
38	A-1.75	Prepare Final ROH Work Package Summary 1. Identify Priority and Cost Estimates. 2. Organize by: a. Authorized Work for: 1. Ship's Force 2. Shipyard 3. Tender or IMA b. Deferred Work	PERA	A-58
39	A-1.5	Prepare Final SFOMS Plan.	SHIP	A-59
40	A-1.5	S.O.A.P. Pre-Arrival Conference	SOAP REP	A-60
41	A-1.5	SPCC Forwards COSAL Package to SOAP Team	SPCC	A-61

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
42	A-1.5	ESO Mails COSAL Package to SOAP Team	ESO	A-61
43	A-1.0	Off-Load Fuel and AMMO	SHIP AND PARENT SQUADRON	A-61
44	A-1.0	Award Contract and Notify all Concerned	SUPSHIP OVERHAUL ONLY	A-61
45	A-0.0	Ship Enters Overhauling Activity and Accomplishes Regular ROH.	ALL	A-62
46	A to C	Monitor Changes and Work Being Accomplished	PERA	A-63
47	C + 2 wks	Complete Overhaul - Wrap-Up 1. Review Deferred Work 2. Review Accomplished Work 3. Prepare Overhaul Critique 4. Prepare Departure Report 5. Review ROH Deficiencies - Including Logistics Support-Develop Plan to Correct Deficiencies. 6. Update COSAL 7. Inventory Spares and Reload	ALL	A-64

INDEX OF TASKS

TASK NO.	TARGET DATE	TASK	ACTION COMMAND	PAGE
48	C + 1	Update CSMP	SHIP	A-66
49	C + 1	Prepare Long Range Maintenance Plan	PERA	A-67
50	C + 2	Assess the Effectiveness of the ROH Plan and Procedures and Prepare Summary Report.	PERA	A-68

-COMSERVPAC-

OVERHAUL PLANNING TASKS

-INTRODUCTION-

September 15, 1972

The tasks described on the following pages are concerned with overhaul planning and laying the groundwork for post-overhaul maintenance. It is convenient to think of the planning process in steps. The basic steps are as follows:

1. Determining requirements, assessing priorities and selecting accomplishing activities.
2. Determining costs in terms of manpower, dollars and time.
3. Considering the priorities, making a trade-off between requirements and available resources in terms of manpower, dollars, and time to come-up with the work package which will be accomplished and the work package which will be deferred.
4. Putting together a detailed plan for accomplishing the work.

In reality the planning process does not happen in steps. Although we can think of the individual steps, the planning process is continuous and all steps are pursued simultaneously.

Basically, at the beginning of the planning process a "best estimate" of the overhaul plan is made using the information available. This plan will be sketchy but will contain estimates on work requirements, costs and means to accomplish the work requirements. The remainder of the planning process is aimed at continually getting more information and refining the plan so that when the ship starts the overhaul, a well defined work package is ready, together with a definite plan for accomplishing the work.

During the overhaul, information gathering and planning continues, so that at the end of the overhaul, post-overhaul maintenance requirements are known. Cost estimates for accomplishing the post-overhaul maintenance are also made and assembled. At the end of the overhaul, work requirements to be accomplished after the overhaul, before the next overhaul, will be defined. In addition, some long range maintenance requirements such as major piping system renewals will also be identified.

The following pages describe the overhaul and maintenance planning process.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>*WHEN</u>	<u>TASK TITLE</u>
1	PERA	Immediately	<u>Obtain Historical Records and Data</u>

WHAT (AND SOME HOW)

As soon as possible after it is determined that a ship is scheduled for an overhaul, the PERA activity will begin assembling all the maintenance history data available on the ship. Such items as past overhaul records, 3-M Maintenance History, and CASREP records will be gathered together for use during the overhaul planning process.

*Dates given in months before start or after completion of the overhaul unless otherwise designated.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
2	SHIP	Immediately	<u>Verify Ship's System Staging Diagrams.</u>

WHAT (AND SOME HOW)

The ship has been furnished a set of diagrams which list and briefly describes all the systems on the ship in staging format. The ship's force will take these staging diagrams and verify that all the systems are covered by the staging diagrams. Cross out systems not on ship and add missing systems. Mark each system on the diagrams with the work center designators of each work center having responsibility for any part of that system. Add notes to diagrams as helpful to ship. These diagrams will be used as a guide and check-off list for the orderly inspection and determination of overhaul work. The diagrams are layed out so that the entire ship is represented by adding up all of the systems represented by the bottom row of system blocks--no holidays, no overlaps. Remember, the purpose of the diagrams is:

Orderly breakdown of ship into systems with identification of work center responsibility --- for use as inspection guides and check-off list to prevent duplication of work or "crack droppers."

Reproduce the number of copies needed for ship's use and send a good legible copy each to COMSERVPAC. COMSERVPAC will reproduce further copies for distribution to PERA, COMSERVGRU, SUPSHIP, and others.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
3	SHIP	Immediately	<u>Perform COSAL Validation</u>

WHAT (AND SOME HOW)

The COSAL validation is a verification and updating of the listing of ship's equipment for use in determining repair parts requirements. In order to have the proper repair parts available, this validation is performed well in advance of the overhaul.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
4	PERA	Immediately	<u>Review and Identify DART Corrective Actions That Can Be Implemen- ted During The ROH.</u>

WHAT (AND SOME HOW)

DART is a special NAVSHIPS program. The acronym stands for: Direction Action Response Technique. The purpose of the program is to correct chronic problems effecting the material readiness of ships in the fleet. The list of DART projects is continually changed as problems are solved and new problems come up. Examples of DART programs which may have an effect on COMSERVPAC ships are the feed pump program and the stream equipment program. PERA will review the current DART programs and determine if any DART projects can be implemented during the ROH.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
5	PERA	Immediately	<u>Prepare List of Essential Systems.</u>

WHAT (AND SOME HOW)

Prepare a list of "equipment or systems that are essential to the operational mission of the ship without which the ship could not depart the ship yard." This list will be used by the overhauling activity to assign the material "Urgency of Need Designation" in accordance with the Uniform Material Movement and Issue Priority System (UMMIPS) as described in NAVSHIPS Instruction 4614.1D.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
6	PERA	Immediately	<u>Prepare ROH ALT/Repair Package Summary -- First Cut.</u>

WHAT (AND SOME HOW)

MERGE AND REVIEW DATA. The PERA activity will take all the data available at this time and assemble it into a work package. The data will be obtained from the CSMP, the alteration lists, and past history. The data will be reviewed for completeness and accuracy. Staging diagrams will be utilized to be sure that all systems are covered. The CSMP work descriptions will be reviewed to make sure that work requirements are clearly defined.

ASSEMBLE WORK PACKAGE. After obtaining work requirement information from various sources and reviewing them for completeness, PERA will assemble the complete work package by EIC. Each work item will be screened to insure correct assignment of priority and accomplishing activities. When this screening is completed, PERA will make the first total work summary report. This work summary report will be broken down by accomplishing activity and priorities.

DETERMINE UNKNOWN WORK REQUIREMENTS. From the first overhaul work summary, PERA will determine those work items which require further information to adequately define actual work requirements and to obtain cost estimates.

DETERMINE KNOWN WORK REQUIREMENTS. From the first work summary, PERA will identify those work requirements for which no further planning information is required. These work requirements will be defined in sufficient work detail so that detailed work estimates can be made and job orders written.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
7 & 8	TYCOM PERA	Immediately	<u>Review Alteration Lists.</u>

WHAT (AND SOME HOW)

Early in the overhaul planning process, tentative ship alterations will be identified. NAVSHIPS will provide the TYCOM with the list of NAVSHIP funded alterations. The TYCOM will develop a tentative list of TYCOM funded alterations. Some analysis by the TYCOM staff, with possible assistance of the PERA activity, may be required to evaluate and determine the alterations to be accomplished during the overhaul. When this list is developed, it will be forwarded to the PERA activity for incorporation into the overhaul work package.

PERA will review the alteration list to determine:

- a. First time ALT drawing requirements
- b. Material requirements
- c. Shipcheck requirements
- d. Revisions to existing drawings
- e. Planning and scheduling events to insure orderly accomplishment of above planning requirements.

PERA will coordinate the ALT package planning with the repair package planning as a part of the total overhaul package.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
9	PERA TYCOM	Prior to Deployment	<u>Brief Ship on Overhaul Preparation.</u>

WHAT (AND SOME HOW)

The purpose of this briefing is to give firsthand instruction to shipboard personnel in all the details of overhaul planning covered in the tasks described in this document. The briefing will cover the following topics:

- A. Planning philosophy
 - 1. Define all work required - requirements
 - a.) Assign priorities
 - b.) Assign accomplishing activities
 - 2. Trade - off against resources available; time, dollars and labor man-hours
 - 3. Split into two packages
 - a.) Approved work - to be accomplished during ROH
 - b.) Deferred work - to be accomplished later as resources become available
- B. Requirements Planning: definition of work required
 - 1. Corrective maintenance work
 - 2. Insurance maintenance work
 - 3. Habitability defect correction work
 - 4. Technical improvements work; D and F ALTS and AER'S
 - 5. Military improvement work; K SHIPALTS
- C. Overhaul Planning - Planning how the work is to be accomplished
 - 1. Material ordering
 - 2. Manpower budget
 - 3. Schedule
 - 4. SFOMS
- D. Overhaul Management - Doing the work - Use of SFOMS
- E. Overhaul completing - wrap-up
- F. Basic principles
 - 1. Preparation of work requests
 - 2. Use of Ship Systems Definition and Index
 - 3. Maintaining CSMP - preparation of:
 - a.) work requests
 - b.) completed actions
 - c.) deferred work
- G. Details of Tasks 1 through 47.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
10	SHIP PERA	Prior to Deployment	<u>Inspect Ship and Prepare Maintenance Data Forms (4790-2K)</u>

WHAT (AND SOME HOW)

The inspection of the ship and the ship systems by work center personnel is the key event for the ship in determining overhaul work requirements. In order to perform this inspection in an orderly manner, the Ship's Systems Definition and Index will be used. Each work center will "Trace Through" the systems for which they are responsible. In tracing through these systems, the work center will note equipments which require repairs. As the work center completes the inspection of a system, the system will be checked off as complete on a copy of the Ship System Definition and Index. In this way, the work center can be sure that all systems are systematically inspected.

As repair requirements are noted, maintenance data forms (4790-2K) will be prepared by the work center personnel and forwarded to the TYCOM for inclusion in the CSMP. The ship's force preparation of maintenance data forms is the single most important task in overhaul planning. Here is where the ship's force records all the things about the ship that they know need repairing (or will need it by overhaul time) up until trade-off. Later in the planning process, the collection of deferred work in the 3-M CSMP will also be converted into work requests. PERA will request COMSERVPAC to provide "automated work requests," one for each active deferral. If there is a deferral in the CSMP, a new work request is not necessary. This saves rewriting deferrals as work requests by hand. After these "automated work requests" are made, additional new work requests are prepared by hand on 4790-2K. An original and five copies are required to be submitted to COMSERVPAC.

(10 Cont'd)

The Ship Systems Definitions and Index is used as a systems check-off list to insure that each ship system is carefully considered and examined for needed repair work.

When you prepare the maintenance data forms be thorough and specific. This maintenance data form will later be used as a work request. Remember in the narrative section to first describe what it is that needs repair, then describe what is wrong, then describe what repairs are needed. Enclosure (8) provides some examples of good and bad work requests. Study them carefully. Lack of complete work request coverage is the single largest fault usually found with ships' force work request package. Poorly prepared work requests with half-baked narrative and shot-gun priority and type of availability assignment is the second largest problem. Establish a screening board to review the work request for all features of quality and completeness of coverage, system by system before release from the ship. High quality work request preparation is a product of careful organization, management, quality control, good technical knowledge and good knowledge of your ship. Eliminate any one of these and you'll have work request problems. PERA will, on a case basis, instruct ships' force on work request preparation. Remember the ship is responsible for submission of work requests for repairs of known defective equipment and systems, and for repairs that it believes will be needed at overhaul time. PERA is responsible for coming up with the Insurance repair overhaul work and assigning the appropriate priority. You may submit insurance requests to the extent you feel qualified to do so. Be sure your rationale for submission of each item is clearly stated on the work request. Write the word "INSURANCE" in lower right corner of the narrative block on the 4790-2K. PERA will look for holes in your work request coverage for known defective equipment or systems, compare the holes with all insurance items, yours and theirs, and then possibly add additional insurance items to the package of known defects. Prior to completion of development of the package of corrective maintenance work requests by ship's force, a series of inspections and tests will be conducted by SRF, Ship's Force and others in accordance with instructions provided by PERA. The results of these tests should be translated into work requests and/or deferrals, wherever possible, by ship's force. Some of this can be done by ship's force without assistance; some will require assistance from PERA or SRF. Ship's force shall establish a control sheet for inspections and tests and maintain a record of who accomplished each, when it was accomplished and the work request numbers generated therefrom. (An exception to this is boiler work. It is not desired that boiler work be requested by ship's force

(10 Cont'd)

until after the pre-overhaul inspection of that boiler. Ships shall maintain the CSMP for known deficiencies.)

Here are some of the common errors made by ship's force that should be avoided:

- a. Ship fails to inspect the ship thoroughly.
- b. Work requests prepared are of poor quality, lacking the required detailed description of the equipment condition and repairs needed. For valves and piping and similar equipment, sizes and quantities are important. The work request should be written so that it clearly notes what is wrong with the equipment and what has to be done in order to repair it. The work request will later be used to estimate what it will take to do the repair work.
- c. Assigning priorities too high merely to put work requests within predicted approval zone destroys validity of the system. Priorities must be selected from the rational application of enclosure (4).
- d. Individual work requests are unnecessarily prepared for each of several pieces of identical repairs. (This problem stems from the instructions contained in OPNAV 43P2 which are unclear.) Paragraph 4-8.1 (Block 9 and 10) of OPNAV 43P2 dated Oct. 1969 explains the procedures for including several pieces of identical equipment on the same work requests.
- e. Failure of ship to list applicable blueprints, tech manuals, etc. and to check availability of each.
- f. Failure of the ship to properly identify the equipment. Use the ship's moun name and equipment identification number whenever possible. For example, Number one main feed pump or main steam cross connection valve MS2.
- g. Incorrect assignment of EIC. Use the Ship Systems Definition and Index to determine the EIC. That's what it's for.

When the maintenance data form preparation is completed, they should be grouped by ship's systems as defined on the ship system diagram and forwarded to COMSERVPAC retaining one copy aboard ship. When completed the work request package will be a mixture of preprinted work requests and hand prepared requests and will contain all corrective maintenance believed by the SHIP to be required during overhaul in order to achieve a "thorough overhaul" regardless of who is recommended to accomplish the work ... Shipyard, Intermediate level activity (Tender, DATC) or ship's force.

All Work recommended for ship's force work shall include an estimate by ship's force of the manhours required to accomplish that work. After the work center personnel have inspected the ship, determined all of the work requirements and prepared a

(10 Cont'd)

maintenance data form, all the maintenance data forms will be reviewed by the department heads. This review will insure that the maintenance data form properly identifies the equipment, clearly indicates what is wrong with the equipment, and what has to be done to fix it. The priorities assigned are to be reviewed and the recommended accomplishing activities also are to be reviewed. After this review, the maintenance data form will be forwarded to the squadron commander for additional screening and processing to update the "Current Ships Maintenance Project (CSMP)".

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
11	SHIP	Prior to Deployment	<u>Start SFOMS Planning</u>

WHAT (AND SOME HOW)

The Ship's Force Overhaul Management System (SFOMS) is used to plan and control the work to be accomplished during the overhaul. The approach used in this management system is simply to establish a plan of action for the entire overhaul period in the planning phase that balances the best estimates of requirements against the best estimates of resources within the restraints imposed by shipyard overhaul work. In order to accomplish this goal, a SFOMS organization must be set-up. Considerable attention should be given to selection of the overhaul manager and/or the SFOMS manager. These assignments should be made sufficiently in advance of the overhaul so that the overhaul manager and the SFOMS manager will then have the opportunity to participate during the requirements planning phase. In addition they will have sufficient time to set-up the kind of organization and overhaul management procedures that are best suited to their ships.

A detailed SFOMS plan is not required until shortly before the start of the overhaul. However, SFOMS planning must start early in order to have the ship ready when the overhaul starts.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
12	PERA	Immediately	<u>Review Up-dated Material History Report, Maintenance Data and Prepare Actions as Required for Inclusion of "Insurance Items" in Work Package.</u>

WHAT (AND SOME HOW)

Review maintenance data system by system, look for holidays or overlaps, prepare tentative list of Insurance work items, grouped by ship systems. In planning for the overhaul, there will be many items that are marginal in performance or that predictably will fail before the next overhaul that are operating satisfactorily prior to the overhaul. The PERA activity will determine equipments for which overhaul work should be done to insure satisfactory operation until the next overhaul, even though the equipment is apparently operating satisfactorily. Historical data and experience will be used to make this determination. When these equipments are identified, the PERA activity will prepare maintenance data forms to be forwarded to the ship for incorporation into the CSMP.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
13	PERA	Immediately	<u>Review Work Package. Prepare Work Briefs (Scopes) and Identify Long Lead Time Material.</u>

WHAT (AND SOME HOW)

Review priority, and recommended accomplishing activities on each work request and provide advice on priority and "who should accomplish" changes. Also review the "COMSERVPAC Routines" contained in enclosure (8) for inclusion in overhaul package. As work requirements become well defined as a result of analysis of information from inspections and tests, PERA will prepare work briefs (scopes) for the shipyard work requirements. These work briefs will have sufficient detail for planning and estimating the work. The work briefs may include related or similar work covered by several work requests. The work requests supporting each work brief will be referenced and attached to the work brief. The work briefs will be forwarded to the overhauling activity for use in planning and estimating.

From review of the overhaul work package, PERA will identify work items which require the purchase of long lead time material. There are materials that must be purchased in advance in order to be sure of their receipt in time for doing the overhaul work. This information will be transmitted to the TYCOM for releasing funds and authorizing purchase.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
14	PERA	A-13	<u>Prepare List of Prede- ployment Tests and In- spections and Plan a Ship Check.</u>

WHAT (AND SOME HOW)

After determining "unknown work requirements" prepare list of inspections and tests that will be used to help define the work requirements. These inspections and tests should be in sufficient detail so that technicians can inspect the ship and convert the "unknown work" into "known work" and overhaul requirements. An agenda or list of these inspections and tests, will be provided to the squadron commander, the ship, and shipyard for planning and conducting these inspections. The list should include a recommended schedule and identification of relative importance of the various tests and inspections. Tests and detailed inspections should not be planned for equipments or systems to any greater depth than required to determine extent of overhaul work required, priority of the work, and who should accomplish it. For example, if it is predetermined that all forcedraft blowers should receive a Class B overhaul by the shipyard for insurance reasons, then it would probably be a waste of time to conduct detailed operational tests, vibration tests or tear down inspection of the blowers.

On the other hand, boilers require detailed inspections to determine exact scope of work required and the division of work between shipyard and ship's force. Steering systems probably should be operationally tested in a carefully controlled manner to assist in determining what corrective or insurance work is required because these systems are especially vital and because they may have gone through several overhaul cycles without significant maintenance. The steering system conceivably may be approaching the end of its trouble free life without corrective maintenance. A careful test or inspection may help assess its hidden condition.

The expertise of PERA is especially important in this area of deciding where to concentrate testing and inspection. Too much is wasteful, detracts from orderly planning, and upsets ships operations. Not enough leaves important decisions to

(14 Cont'd)

chance or leaves them to be made after the overhaul itself starts. A fine degree of judgement based on experience, recorded history, and engineering expertise is required here. This is one of the strong points of PERA and we will lean on them heavily.

Based on the work package submitted by the ship (Task 10), the list of Inspections and tests, other studies and analysis made by PERA and approved by COMSERVPAC PERA will plan a small ship check team of appropriate personnel to board the ship prior to deployment for the following purposes:

- a. To inspect the ship for more refined cost estimate on existing work requests.
- b. To insure that all systems of ship are adequately covered by definitive work requests.
- c. To assist ship's force in converting Insurance and other work items developed by PERA into suitable work requests.
- d. To further analyze written results of tests and Inspections and to assist ship in conversion of same to appropriate maintenance data forms (4790-2K) and cost estimates.
- e. To identify completed or partially completed work not previously reported or for which completions are in the reporting pipeline.
- f. To assist the ship in identifying materials for ship's force and intermediate activity level.
- g. To develop bills of material and other refined details for shipyard work.
- h. To assist ship's force in starting the "Overhaul Planning" phase of the ROH.
- i. To assist ship's force in developing their ship's force overhaul management organization and plan (SFOMS).
- j. Other tasks as requested by COMSERVPAC or the ship.

The size of the team should be small.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
15	SHIP, PERA OTHERS ASSIST	A-10	<u>Perform Predeployment Inspections, Tests and Ship Check.</u>

WHAT (AND SOME HOW)

PERA is responsible for determining the requirements for tests and inspections as outlined in Task 14. PERA will coordinate and make arrangements with specialists and experts such as NAVSEC, NSMSES, and others as required to observe and assist with the conducts and interpretation of the tests and inspections.

The ship is responsible for the actual conduct of the inspections and tests designated in the PERA prepared agenda. The purpose of these inspections and tests is to help define the "unknown work" and the partially defined work requirements. Although this seems like too far in advance of the start of the overhaul, considerable information can be obtained by performing the inspection and tests at this time. The ship will be at least two-thirds of the way through a normal overhaul cycle. Under normal conditions, considerable wear and tear will have been experienced on the equipment and systems. The results of these tests and inspections will be used to determine the essential pre-deployment work requirements and to further define the regular overhaul work requirements. Although, the ship's force has the responsibility of performing these inspections and tests, they will be assisted by PERA and shipyard personnel in conducting and observing the results of the tests. As tests are completed and work requirements determined, the ship's force will prepare maintenance data forms (4790-2K) and add the new work requirements to the CSMP. Tests conducted under the supervision of PERA and shipyard technical personnel will be reported in the form of technical reports to be forwarded to PERA for defining the overhaul work package.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
16	NAVSHIPS	427 A-10	<u>Issue Letter Listing Tentative "K" ALTS Planned.</u>

WHAT (AND SOME HOW)

NAVSHIPS will issue a letter listing Title K Alterations which probably will be authorized for accomplishment during the overhaul. The purpose of this letter is to give advance notice so that affected organizations can integrate K Alt information with other repair and alteration planning. This advanced notice is not authorization to proceed, but only information for planning purposes. The letter will also contain the list of "Special Program Material" required to accomplish the alteration, The list of authorized K ALTS is issued as an enclosure to the "180 day letter" (Task 28).

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
17	NAVORD	A-10	<u>Issue Message Listing Tentative ORDALTS Planned.</u>

WHAT (AND SOME HOW)

NAVORD will issue an advance planning letter for ORDALTS similar to the NAVSHIPS letter for K ALTS (above in Task 16).

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
18	NAVSHIPYARD or SUPSHIPS	A-9 Start	<u>Cost Estimate All Known Work and Ident- ify Missing Work.</u>

WHAT (AND SOME HOW)

Develop manpower and cost estimates for all work requests, preliminary insurance items and selected COMSERVPAC Routines priority 4 or higher. Work closely with PERA and recommend any work that seems to be missing from the package based on experience. Prepare a list of shipyard routines that are missing from work package. Start planning and material ordering as required for long lead time work to be released early. Return copy of estimated work package to PERA and COMSERVPAC.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
19	SHIP	A-9	<u>Ship Deploys-Update CSMP and ROH Plan-Forward Completed Actions and New Work Requests.</u>

WHAT (AND SOME HOW)

Prior to ship deployment the urgent corrective maintenance requirements found during the pre-deployment/pre-overhaul inspection will be accomplished.

As the ship completes maintenance work described on maintenance data form deferrals and entered in the CSMP, the ship has the responsibility for filling-out and forwarding completed action reports for updating the CSMP. The completed action report serves two purposes: First, it deletes the item from the CSMP. Second, it is the record of the maintenance work that was actually done. The completed action reports should describe exactly what was done. A short word stating "completed" is usually not sufficient information. These completed action reports will be entered into the 3-M Maintenance History File. This Maintenance History file will be used to determine what future maintenance actions should be taken. If completed maintenance actions are not adequately filled-out and forwarded for record, it may be assumed that there have been no problems with particular equipments.

As the ship goes about its daily operations, equipment will continue to require new corrective maintenance actions. As these new items emerge, additional maintenance data forms are to be filled out and forwarded for updating the CSMP. Doing this on a regular basis will insure that all corrective maintenance requirements are considered when the overhaul work package is put together.

Similarly, some of the initial maintenance data form deferrals submitted by ship's force will be completed before the overhaul by one method or another. Submission of the normal 3-M MDCS documentation by ship's force to COMSERVPAC will be all that is required to remove these items from the Overhaul work package. Insure that completions are submitted promptly and accurately.

(19 cont'd)

Partial completions should be submitted as change deferrals promptly. COMSERVPAC will keep PERA informed of the submission of these documents. PERA will adjust the developing work packages accordingly. As the work package becomes more refined, the ship will update their SFOMS plan.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
20	TYCOM	A-7.5	<u>Forward Pre-printed Work Requests to PERA.</u>

WHAT (AND SOME HOW)

Shortly after the ship deploys, PERA will request the TYCOM to take the CSMP record and to run-off pre-printed work requests from it. These pre-printed work requests will be based on the information contained in the CSMP at that time. At this point in time the CSMP as such will cease to exist as the means for tracking the material condition of the ship and will no longer be updated until after the overhaul. PERA will notify the ship when this occurs.

After the pre-printed work requests are issued, as new work items are discovered the ship will forward new handwritten work requests for inclusion in the overhaul work package. New handwritten work requests are not required for any work items already included in the CSMP.

The overhaul work package will consist of a combination of pre-printed work requests from the CSMP and new handwritten work requests from the ship.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
21	PERA	A-9 to A-6	<u>Review and Validate All Work Requests. Consolidate Overhaul Planning And Identify Weaknesses. Prepare Integrated Work Package Summary.</u>

WHAT (AND SOME HOW)

Validate work requests and insurance items. Validation consists of concurrence with or changing of priorities and "who accomplish" recommendations, and acceptance or rejection of work requests as acceptable. Advise the ship by message of any changes made in priority or "who accomplish assignment." After NAVSHIPYD or SUPSHIPS completes the preliminary estimates requested in Task 18, PERA prepares a preliminary overhaul planning summary sheet similar to enclosure (6). Identify those systems of the ship requiring further inspections or study.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
22	PERA	A-9 to A-6	<u>Review Work Package.</u> <u>Determine "Known" Work</u> <u>and Identify Long Lead</u> <u>Time Requirements. Re-</u> <u>view "Unknown" Work.</u>

WHAT (AND SOME HOW)

As all the results of the predeployment inspections and tests are incorporated in the work package, PERA will re-review the work package. From this review, PERA will determine the quality of the information contained in the work package.

In reviewing the work package, PERA will identify work requirements which have material, planning, or engineering requirements that must be ordered well in advance in order to be sure that the material or service is available when required for the overhaul. The list of these requirements will be prepared along with information about the priority of the work required and the accomplishing activity. These lists will be forwarded to the TYCOM with recommendations for advance ordering. The list of long lead time requirements will be revised and updated as additional information regarding work requirements is obtained.

From the review of the summary work package, PERA will separate out those work items for which adequate information is available for planning and estimating. For these "known" work requirements, review against the CSMP to be sure that all work requirements are contained in the CSMP. For new work requirements such as insurance items, PERA will forward a maintenance data form to the ship to incorporate the work items in the CSMP and to obtain a Job Sequence Number (JSN).

From the review of the work package, PERA will separate out those work items which require further definition of information for planning and estimating. After pre-deployment inspections and tests have been completed and other possible overhaul requirements such as, insurance items have been identified, there will be many possible work items for which adequate information is not available. These "unknown work" items should be identified and separated from the work package.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
23	PERA	A-6	<u>Prepare Pre-overhaul Test and Inspections Tailored Around "Known"/ "Unknown" Work Package.</u>

WHAT (AND SOME HOW)

Although many of the overhaul work requirements can be determined well in advance of the overhaul, such as prior to deployment, there are many systems and equipments from which information must be obtained just prior to the overhaul. Such equipment as boilers and replenishment at sea equipment may be subjected to special tests in order to define work requirements. PERA will review the "unknown work package."

For those work items for which adequate information is not available to develop a work package, PERA will prepare a plan for obtaining this information. This plan may include special tests, ship checks and special inspections, or any other activity which will help define the "unknown work." Part of the plan will consist of pre-overall tests and inspections to be conducted by the ship with the assistance of PERA, SRF, the Shipyard or others. The plan should include recommended schedule and identification of relative importance of the various tests and inspections.

In developing the plan for pre-overhaul tests and inspections, the same philosophy as used in developing the pre-deployment test and inspections (Task 14) must be considered. Tests and detailed inspections should not be planned for equipments or systems to any greater depth than required to determine extent of overhaul work required, priority of the work, and who should accomplish it.

Based on the updated work packages submitted by the Ship (Task 19), list of Inspections and tests, other studies and analysis made by PERA and approved by COMSERVPAC, PERA will plan a small ship check team of appropriate personnel to board the ship in WESTPAC (Similar to the pre-deployment ship check, Task 14 and 15) for the following purposes:

- a. To inspect the ship for more refined cost estimate on existing work requests.
- b. To insure that all systems of ship are adequately covered by definitive work requests.

(23 Cont'd)

- c. To assist ship's force in converting Insurance and other new work items developed by PERA into suitable work requests.
- d. To further analyze written results of Tests and Inspections and to assist ship in conversion of same to appropriate work requests and cost estimates.
- e. To identify completed or partially completed work not previously reported or for which completions are in the reporting pipeline.
- f. To assist the ship in identifying materials for ship's force and intermediate activity level.
- g. To develop bills of material and other refined details for shipyard work.
- h. To assist ship's force in refining the "Overhaul Planning" phase of the ROH.
- i. To assist ship's force in refining their ship's force overhaul management organization and plan (SFOMS).
- j. Other tasks as requested by COMSERVPAC or the Ship.

The size of the team should be small and maximum use should be made of WESTPAC repair activity personnel.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
24	SQUADRON PERA SHIP	A-6 to A-3	<u>Arrange and Accomplish</u> <u>Pre-ROH Test & Inspec-</u> <u>tions Tailored around</u> <u>WESTPAC Operations.</u>

WHAT (AND SOME HOW)

The squadron will review the plan for obtaining the information on the "unknown work" requirements. After this review, the squadron will schedule and make arrangements with the Ship, SRF, PERA and others for the performance of the special tests and inspections to be accomplished before the ship returns from deployment.

Execute plan developed in Task 23. Product of this task should be all information needed to complete the requirements planning phase. PERA should have the information necessary to determine the final recommended overhaul package for shipyard, intermediate level repair activities and ship's force. In addition, the Ship's Force Overhaul Management Organization will have been developed and will be reviewed by COMSERVPAC.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
25	SHIP	A-6	<u>Prepare Ship's Force Manpower Budget</u>

WHAT (AND SOME HOW)

In order to determine what ship's force manpower is available for repair work during the regular overhaul period (work center by work center), a logical step-by-step manpower analysis must be made.

First an estimate is made of the total manpower available in each work center. Then requirements such as watch standing, school, leave, firewatch, PMS, etc. are made for each work center. The difference between the two is the "productive" manpower available for repair work. Enclosure (9) contains detailed instruction and the forms necessary for orderly budgeting of manpower. This is one of the most important steps for the ship in overhaul planning - it must be recognized that manpower analysis is a reiterative process requiring considerable attention by Executive Officer and Department Heads as well as intermediate managers and the work center supervisors. Guidance must be put out by the Executive Officer regarding leave, TAD, school, mess cooking, etc. Consideration must be given to assigning the overhead functions such as fire watch, QD watches, mess cooking to those departments or work centers that will probably have the lowest amount of repair work during the overhaul. Adjustments will be necessary when the workload firms-up, but some pretty good approximations can be made initially.

It usually comes as a surprise to ship's force personnel that only about 25% of the manpower aboard can be diverted to repair work during an overhaul. The other 75% is used up (by no means wasted) on the so called "overhead functions". Careful planning will prevent the development of an impossible ship's force work package that will become a heartache later when it becomes impossible or extremely burdensome to accomplish during the ROH period. The intent of the manpower budget plan is to identify what manpower is rationally available for repair work by ship's force within the constraints of other things that must be done. Not to try to force more productive work out of the ship. ---Work smarter not harder is the motto.

(25 Cont'd)

The process of manpower budgeting has some definite salutary effects also. It usually assists ships in recognizing, organizing and planning for other things that must be accomplished during the ROH period such as off ship training and leave.

The format of the manpower budget sheets, enclosure (9) is such that the manpower information is in the correct format for direct insertion into the ship's force overhaul management system computer program. No extensive rewriting is necessary.

A preliminary manpower budget will be prepared and submitted to COMSERVPAC. COMSERVPAC will review the preliminary budget and provide further guidance as necessary. The manpower budget will be updated and submitted to COMSERVPAC about 3 months before the start of the ROH. The data contained in this budget will be used in the trade-off conference.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
26	SHIP	A-6	<u>Order Ship's Force Long Lead Time Overhaul Material.</u>

WHAT (AND SOME HOW)

In accordance with COMSERVPACINST 7042.7A the ship will be provided a special grant of OPTAR funds with which to purchase material for ship's force overhaul work. One of the keys to a successful overhaul is to have necessary materials, tools, instructions, (such as drawings, NAVSHIPS MANUALS, NAVORD documents, etc.) on hand at the beginning of a ship's force repair job. To encourage and facilitate this, special funds are provided early for the procurement of repair parts for ship's force repair jobs, identified (by the ship) for ship's force accomplishment that have been assigned priority 2 or higher, just as soon as they are discovered and recorded by the ship. Some of these jobs probably will not end up in the approved ship's force work package but more is to be gained by timely ordering of materials, tools, drawings, manuals, etc. than waiting until we are 100% sure of the exact work package. The ship must identify the materials, tools, manuals, etc. needed for each ship's force job and order same in time to insure that they are on board when it is desired to accomplish the repair work. Ordering too early causes problems as well as ordering too late, so some judgement is required. The ship shall request special SFO grants to the extent that the funds are required for timely material ordering in accordance with COMSERVPACINST 7042.7A. Only those funds that will be obligated during a quarter should be requested to insure obligation of funds by the end of the quarter.

An efficient way of accomplishing this task is for work centers to make up a detailed bill of material for each ship's force job as it is identified and recorded. The planning and log sheets contained in enclosure (5) will be used. The JCN of the job is recorded when the material is actually ordered, the stub number of the order is entered on the same sheet. Later on when that job is broken into smaller element (Key OPS), the key OP number will be entered on the same sheet alongside each piece of material, tool, NAVSHIPS Manual, etc. to identify each

(26 Cont'd)

item to its particular work element or key OP. Later on when the material is received, it is checked off on the same sheet. This method of developing and logging material requirements for each job at the work center provides an orderly and convenient method of avoiding the problem of material scrounging and expediting after the work starts. A special series of stub numbers is used for this SFO material to allow easy identification as it is received on board and to prevent its inadvertant loss or intermixture with normal spare parts and supplies.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
27	SHIP	A-6	<u>Submit New Work Re- quests for Items not Contained in CSMP.</u>

WHAT (AND SOME HOW)

As new work items are discovered the ship will prepare new work requests to describe the work required. This is a continuing effort that is never finished. The work requests must identify the equipment, relate what is wrong and describe the required repairs in sufficient detail for planning and estimating.

Similarly, completed action reports are to be filled out and forwarded as repairs are made by SRF or ship's force.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
28	NAVSHIPS	A-6	<u>Issue 180 Day Letter on "K" ALTS.</u>

WHAT (AND SOME HOW)

NAVSHIPS will issue a letter listing the Title K alterations authorized for accomplishment during the forthcoming ROH. The 180 day letter will contain the list of "Special Program Material" and the procuring activities. The 180 day letter supersedes the advanced planning letter (Task 16).

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
29	NAVORD	A-6	<u>Issue Authorization Letter on ORDALTS.</u>

WHAT (AND SOME HOW)

NAVORD will issue an ORDALT Authorization letter similar to the NAVSHIPS 180 day letter above. This authorization letter will supersede the advance planning letter (Task 17).

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
30	SQUADRON	A-6	<u>Schedule ROH Tender Availability and Other IMA Availabilities.</u>

WHAT (AND SOME HOW)

Identify and schedule the intermediate level repair activity (tender, MOTU, DATC, etc.) services which will be available during the overhaul. Provide estimates of the amount and kinds of work available from each. Send this information to the Ship, PERA and TYCOM. Update the information as it changes.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
31	PERA	A-4	<u>Review, Refine and Assemble Complete ROH Work Package (Scope all Repair Actions)</u>

WHAT (AND SOME HOW)

As indicated previously for other tasks, when information becomes available to convert the "unknown work" into well defined overhaul work requirements, PERA will review and update the overhaul work package. This reviewing and updating is a continuous process. It consists of refining the description of the work items and obtaining up to date estimates for accomplishing the work. As this reviewing process continues, periodic summary reports will be produced that show the contents of the total work package. The summary reports will be structured by EIC using the Ship System Staging Diagrams. The summary work reports will indicate the priority of the work, the accomplishing activity and the cost to accomplish the work.

As the work items become "known", the work briefs or scopes will be prepared. These work briefs will be forwarded to the overhaul activity for planning and estimating. When the estimates are completed, the estimates will be returned to the PERA for use in the trade-off analysis.

OVERHAUL PLANNING TASKS

TASK NO.	WHO	WHEN	TASK TITLE
32	PERA	A-3.5	<u>Perform Trade-off Analysis.</u>

WHAT (AND SOME HOW)

After the ship has prepared its work requests for all known corrective work and PERA and the shipyard have done their best to identify insurance jobs and various inspections have been conducted and converted to work requests and the shipyard has cost estimated the work ---- after all of this, we have done a pretty good job of describing what is needed to do a thorough overhaul.

What needs to be done now is to compare what needs to be done with what we have to do it with and decide on what will be done and what will be deferred. This process is called "trade-off". The trade-Off analysis is a tool used to determine which work requirements will be accomplished during the overhaul.

Up to the time of performing the trade-off analysis, the planning process is devoted to obtaining the information required to make this analysis. Emphasis is placed on obtaining well defined, descriptive work requirements. Reviews are made to insure designation of the proper priority and accomplishing activity for the work requirements. The work requirements were forwarded to planners and estimators to obtain cost estimates. During the trade-off analysis, all of this information is considered in establishing a recommended overhaul work package.

PERA will do the first part of the trade-off by developing what looks to them like a balanced overhaul. They will compare the jobs recommended for accomplishment by the shipyard in the top priority categories with the planned dollars available. They will compare the work recommended for accomplishment by the ship with the ship's manpower budget ---- same for the repair ship work. This will be done using summary sheets similar to enclosure (6). They will then move jobs around a little (from ship's force to shipyard) to try to balance the overhaul package out to get the most important work (highest priority) accomplished during the overhaul.

(32 Cont'd)

The guides shown below exemplify how this works:

PRI	SY	SF	TENDER
1			
2			
3			
4			
5			

FIGURE 1

Suppose the resources available to shipyard, ship's force and tender would allow only for the accomplishment of the amount of work in the shaded part of Figure 1 above. It wouldn't make much sense to leave it that way because the priority 3 work for ship's force that would remain unaccomplished is more important than the shipyard priority 4 work that is all getting accomplished. What is called for here is to shift some of the work originally recommended for ship's force over to shipyard and drop out some of the less important priority 4 shipyard work. This would give us a balanced overhaul as depicted in Figure 2 below:

PRI	SY	SF	TENDER
1			
2			
3			
4			
5			

FIGURE 2

(32 Cont'd)

The process is a little more complex than this but you get the idea!

When PERA has pushed things around to where they think they have a good plan (possibly with alternates) we are then ready for the trade-off conference, Task 37. Results of the trade-off analysis will be summarized in a final ROH recommended work package. In this summary, the work requirements will be divided into four groups:

1. Work to be accomplished by ships force.
2. Work to be accomplished by shipyard.
3. Work to be accomplished by repair ship.
4. Work to be deferred.

The summary report will be backed up with appendices containing the details of the analysis and the rationale for the recommended decisions.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
33	PERA	A-3	<u>Submit Work Package Report for Review</u>

WHAT (AND SOME HOW)

After preparing the trade-off analysis report, PERA will submit the report to the TYCOM, Squardon Commander, Ship, and the overhauling activity for review prior to the trade-off conference. This advanced review will permit the trade-off attendees to come to the conference fully prepared to discuss the pros and cons of the various proposed work packages. Advance review in preparation of the trade-off conference is an important element of a successful conference.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
34	CONUS BASED SHIPS ONLY SHIP AND PERA	A-2.25	<u>Ship Arrives Pearl -</u> <u>Pre-Overhaul Ship</u> <u>Check and Inspections</u> <u>(Pearl to CONUS)</u>

WHAT (AND SOME HOW)

This ship check may substitute or supplement the post-deployment pre-overhaul ship check performed around WESTPAC operations (TASK 24). The purpose of this pre-overhaul check is the same as TASK 24. Preparation for and conduct of tests and inspections enroute from Pearl to the mainland should follow the guidelines presented in Tasks 23 and 24. This is the last chance to obtain information to define the overhaul work package.

In addition to performing tests and inspections, the current status of overhaul planning will be reviewed. This ship's SFOMS plan will be reviewed and assistance will be provided to assist ship's force in the SFOMS set-up. The ship's manpower budget, in particular, will be reviewed.

The current status of the work package will be determined. At this point the work package consists of pre-printed work requests from the CSMP and handwritten work requests. Work accomplished at various SRFS while deployed will be evaluated and factored into the work package. Inputs for bringing the work package up-to-date will be prepared. It is important that the total work package represent the material condition of the ship. Work requirements not covered by handwritten work requests or generated from the CSMP as pre-printed work requests will not be accomplished during the overhaul.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
35	CONUS BASED SHIPS ONLY TYCOM	A-2.25	<u>Work Package Review Conference at Pearl</u>

WHAT (AND SOME HOW)

This review is conducted to evaluate the status of over-haul preparation. A secondary purpose is to review the up-to-date work package and to release all high priority work in advance of the trade-off conference.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
36	SHIP	A-2	<u>SHIP ARRIVES HOME PORT</u>

WHAT (AND SOME HOW)

As soon as the ship arrives, the ship goes "cold-iron" and commences a 30 day stand-down period. Only the minimal watch and essential functions will be maintained during this period. Generally, ship's force personnel will not be available for consultations or inspections. Every attempt should be made to complete ship checks and tests and inspections requiring the services of ship's force personnel prior to the arrival of the ship at its home port.

After arrival of the ship at its home port, limited visits by overhauling activity personnel for planning and estimating work will be permitted during the 30 day stand-down period.

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OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
37	PERA	A-2	<u>Conduct Work Package Trade-off Conference.</u>

WHAT (AND SOME HOW)

During the conference, PERA will present the results of the trade-off analysis to the TYCOM and Squadron Commander for review. Ships force and shipyard personnel will also participate in the conference. The purpose of the trade-off conference is to finalize the overhaul work packages.

PERA will explain what will be accomplished, what will be deferred and their estimates of what the result of deferrals will be. PERA will identify areas that are yet unknown and indicate the dollars they recommend for reservations for these areas. The other attendees will study the plan(s) presented by PERA and comment as appropriate. The ship will look for appropriate balance of work and relative importance of jobs at the immediate cut-off point on the form. The Squadron Commander will look at the plan from the viewpoint of the ship reliability he is buying and the trade-off between ROH dollars spent now and RAV dollars spent later. The TYCOM will do likewise.

The TYCOM representative will make the final decisions with regards to the contents of the approved and deferred work packages.

The purpose of the conference is to make the final decisions with regards to the work packages. During the conference, each activity will be given a set of definitive work requirements to be accomplished by them during the overhaul period. Work that is to be deferred will be clearly set aside. Ships force, shipyard and repair ship work packages will be clearly defined.

The trade-off will be conducted as soon as possible. It is based on the best cost estimates available and meant to minimize the effect of the ship during the 30-day stand-down and maximize the overhaul planning lead time. The goal will be to conduct the trade-off immediately upon arrival at home port.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
38	PERA	A-1.75	<u>Prepare Final ROH Work Package Summary.</u>

WHAT (AND SOME HOW)

The trade-off conference results in TYCOM authorization and approval of work items to be accomplished by the various overhauling activities and disapproval or deferral of other work items.

Immediately after the trade-off conference PERA will document the decisions made at the trade-off conference by preparing a final ROH Work Package Summary. This summary will be a detailed document identifying the approved work packages to be accomplished by ship's force, shipyard, and intermediate maintenance activities during the overhaul. A balance sheet will also be prepared by PERA, and included in the Summary, showing the cost estimates for authorized work, broken down appropriately, and the funds reserved for growth and new work.

The deferred work will also be documented in the Final Summary Report. For each deferred work item, the Summary will contain the reasons why the work is deferred and also an analysis of the effects of not accomplishing the work.

This Final ROH Work Summary document will record the official agreement of the content of the overhaul package. Future changes to the overhaul package content shall use this document as a reference point.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
39	SHIP	A-1.5	<u>Prepare Final SFOMS Plan</u>

WHAT (AND SOME HOW)

During the planning process, the ships force personnel are continuously updating the CSMP, manpower budget and material requirements as information becomes available. Preliminary overhaul plans are prepared and updated. After the trade-off conference, the ships force will prepare a final overhaul plan. This plan will contain information on the overhaul management organization, manpower, material, and the overhaul schedule. This plan will be forwarded to the squadron commander and the TYCOM for review.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
40	SOAP REP	A-1.5	<u>S.O.A.P. Pre-arrival Conference</u>

WHAT (AND SOME HOW)

SOAP is an acronym for Supply Operations Assistance Program. The SOAP Team is concerned with spare repair parts. The pre-arrival conference is conducted to coordinate the ship's supply organization and the SOAP Team during the overhaul. Provisions for off-loading, storage, replacement and reloading of parts will be set-up during this meeting.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
41	SPCC	A-1.5	<u>Forward COSAL Package to SOAP Team</u>

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
42	ESO	A-1.5	<u>Forward COSAL Package to SOAP Team</u>

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
43	SHIP AND SQUADRON	A-1.0	<u>Off-load Fuel and Ammunition</u>

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
44	SUPSHIPS (COMMERCIAL SHIPYARD ROH ONLY)	A-1.0	<u>Award Contract and Notify all Concerned</u>

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
45	SHIP OVERHAULING ACTIVITY	A-0.0	<u>Ship Enters Overhaul ing Activity and Accom- plishes Regular Over- haul (ROH)</u>

WHAT (AND SOME HOW)

During the regular overhaul, each activity accomplishes their portion of the work requirements. As with all large undertakings, regardless of how well planned, changes will occur. These changes will be caused by uncovering of new information or changes in availability of manpower, materials or dollars. Some of the work that was deferred may be accomplished. Some work that was scheduled for accomplishment may be deferred. In any event, the ship will eventually be put back together again. Tests and trials will be conducted and the ship will complete the overhaul and be put back into service.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
46	PERA	DURING ROH A to C	<u>Monitor Changes and Work Being Accomplished</u>

WHAT (AND SOME HOW)

MONITOR CHANGES. During the overhaul period PERA will monitor changes which occur. The purpose of monitoring these changes is to obtain information with regards to adequacy of the original work package. This information will be used to assess the effectiveness of the planning process. It will be later used to improve the overhaul planning process on future overhauls.

MONITOR WORK BEING ACCOMPLISHED. The purpose of monitoring work being accomplished is to determine "emergent" work requirements. During an overhaul, as the mechanics accomplish the work requirements, many things can be learned. The pre-overhaul plan will only describe in a general way, the work that is being accomplished. The actual work accomplished will vary in complexity and detail. The purpose of this monitoring activity is to record the actual work that is being accomplished.

In addition, the overhaul period is the best time to determine the material condition of equipment and systems. This monitoring activity will record these conditions for use in preparing the post-overhaul maintenance plan.

NOTE:

This monitoring activity is not intended to be a quality assurance inspection or progressing activity. The monitoring should be done only as necessary to obtain information to aid in developing the post overhaul maintenance requirements and to improve future overhaul planning. Maximum use should be made of existing management information systems utilized by the overhauling activities to control the overhaul. Only the minimum amount of ship checking should be undertaken.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
47	SHIP SHIPYARD PERA	C+0.5	<u>Complete Overhaul- Wrap-up</u>

WHAT (AND SOME HOW)

REVIEW DEFERRED WORK. When the overhaul work is completed, the ship's personnel will review the work which was deferred during the overhaul. This review will be conducted to insure that an up to date deferred work list is obtained. Emphasis should be given to determine that the list actually contains "real" deferred work items and not "nice to have" items which will probably never be accomplished. This deferred work list should represent all the items which should be accomplished to bring the ship up to a perfect material condition. PERA will assist ship's personnel in reviewing the deferred work.

REVIEW ACCOMPLISHED WORK. At the end of the overhaul period, the work that was accomplished will be reviewed against the work that was planned. This information will be checked against the deferred work list. PERA will assist the ship in accomplishing this task.

PREPARE OVERHAUL CRITIQUE. When the overhaul is completed, the ships commanding officer with the assistance of the overhaul manager will prepare an overhaul report. This report will address the results of the overhaul and highlight problems encountered during the overhaul. The report will also contain recommendations concerning planning and managing future overhauls.

PREPARE DEPARTURE REPORT. After the completion of the overhaul the shipyard will prepare a departure report as they do at the present time. This report will contain financial information and other information concerning the work accomplished during the overhaul.

REVIEW ROH DEFICIENCIES. Near the completion of the overhaul, the ships force will review all the work scheduled for accomplishment during the overhaul period. The purpose of this review is to determine outstanding work requirements not yet accomplished. Particular attention should be paid to software items

(47 Cont'd)

such as updating plans to incorporate changes that were made during the overhaul and obtaining corrected or new technical manuals for equipment changes. In addition, deficiencies discovered during tests and trials shall also be highlighted. PERA and the squadron will assist the ships force to determine these deficiencies.

DEVELOP PLAN TO CORRECT DEFICIENCIES AND OBTAIN DOCUMENTS. After identifying deficiencies and document requirements, the ship personnel with the assistance of PERA and the squadron will prepare a plan for correcting deficiencies and obtaining documents. This plan will identify responsible activities, the action to be taken and when the action is to be completed. The ships force will later monitor accomplishment of this plan and report problem areas to the proper parties for assistance and action.

UPDATE COSAL. Near the end of the overhaul period, the ship's force, particularly the work center and supply personnel, will review the COSAL. The purpose of this review is to compare the COSAL with the actual equipment on the ship at the end of the overhaul. Changes obtained during this review will be marked in the ships COSAL and forwarded to the responsible inventory control point (SPCC or ESO) for updating the COSAL.

INVENTORY SPARES AND RELOAD. During the overhaul, the S.O.A.P. (Supply Operations Assistance Program) Team will be working with the ships supply personnel to inventory spare parts. At the beginning of the overhaul, all the spare parts will be off-loaded. Near the end of the overhaul, the spares will be inventoried to account for usage during the overhaul and to determine shortages. The spare parts will then be reloaded on the ship and replacements ordered by the shipyard for any shortages.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
48	SHIP PERA ASSIST	C + 1.0	<u>UPDATE CSMP</u>

WHAT (AND SOME HOW)

After the overhaul, the ship will work with PERA to obtain an up-to-date listing of deferred work. This listing will be used to update the CSMP.

In addition, all the accomplished work will be reviewed. For all accomplished work, Maintenance Data Form Completed Action Reports (4790-2K forms) will be filled out and forwarded to the TYCOM for processing into the ships 3-M History File. The "Remarks" section of the Completed Action Report should contain information describing exactly what was done. This is the only record where such information is filed for future reference. In planning the next ROH or RAV, this information is invaluable for helping to determine the condition of equipment. In addition to providing this historic record, filling-out and filing the Completed Action Report automatically deletes the item from the deferred maintenance list.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
49	PERA	C + 1.0	<u>Prepare Long Range Maintenance Requirements</u>

WHAT (AND SOME HOW)

Early in the overhaul planning process, the PERA activity will begin to identify equipment or systems for which long range maintenance actions will be required. Such items as plate corrosion, equipment deterioration and pipe corrosion will be considered. Tentative plans and schedules for an orderly repair or replacement of predictably worn out equipment or systems will be developed. Later during the overhaul process, this tentative plan will be updated as more information becomes available.

After the overhaul, PERA will obtain overhaul records from the ship and the overhauling activity. These records will include data on all maintenance accomplished and deferred during the overhaul planning process. The records will be reviewed to be sure that they are complete and that cost estimates are updated. The maintenance plan is to contain a work package that describes the maintenance work required until the next overhaul and some major items targeted for future overhauls. The PERA activity will analyse this work package and divide it into two groups. The first group will be the current "deferred" work package. The second group will be the long range maintenance requirements. The deferred work will be forwarded to the ship for updating of the CSMP. The long range maintenance requirement will be put together into a long range planning document, including cost estimates and the skills and time required to accomplish it.

Although this plan will primarily address the period between overhauls, certain major large scale maintenance requirements, such as extensive shell plating renewals or main turbine re-blading, may be targeted for future overhaul periods. The maintenance requirements will be described in the plan in sufficient detail to define actual work requirements and provide a basis for estimates. The long range maintenance items will be kept separate from deferred maintenance items and will not be included in the CSMP.

It is intended, that at the completion of the overhaul, the ship will have a plan for maintenance that will take care of all the predictable requirements for the ship until the next overhaul.

OVERHAUL PLANNING TASKS

<u>TASK NO.</u>	<u>WHO</u>	<u>WHEN</u>	<u>TASK TITLE</u>
50	PERA	C + 2	<u>Assess the Effectiveness of the ROH Plan and Procedures and Prepare Summary Report</u>

WHAT (AND SOME HOW)

At the end of the overhaul PERA will obtain information concerning the deferred work and accomplished work, other information from the ships Overhaul Report and the shipyards departure report, and additional information from ROH deficiency list. This information will be reviewed and analyzed. The purpose of this review and analysis is to determine the effectiveness of the overhaul planning process and the management of the overhaul. Changes to the overhaul plan, in particular additional work requirements, will be evaluated.

The results of the analysis of the overhaul will be presented in the summary report. The information in this report will be used as a basis for improving overhaul planning and management on future ship overhauls.